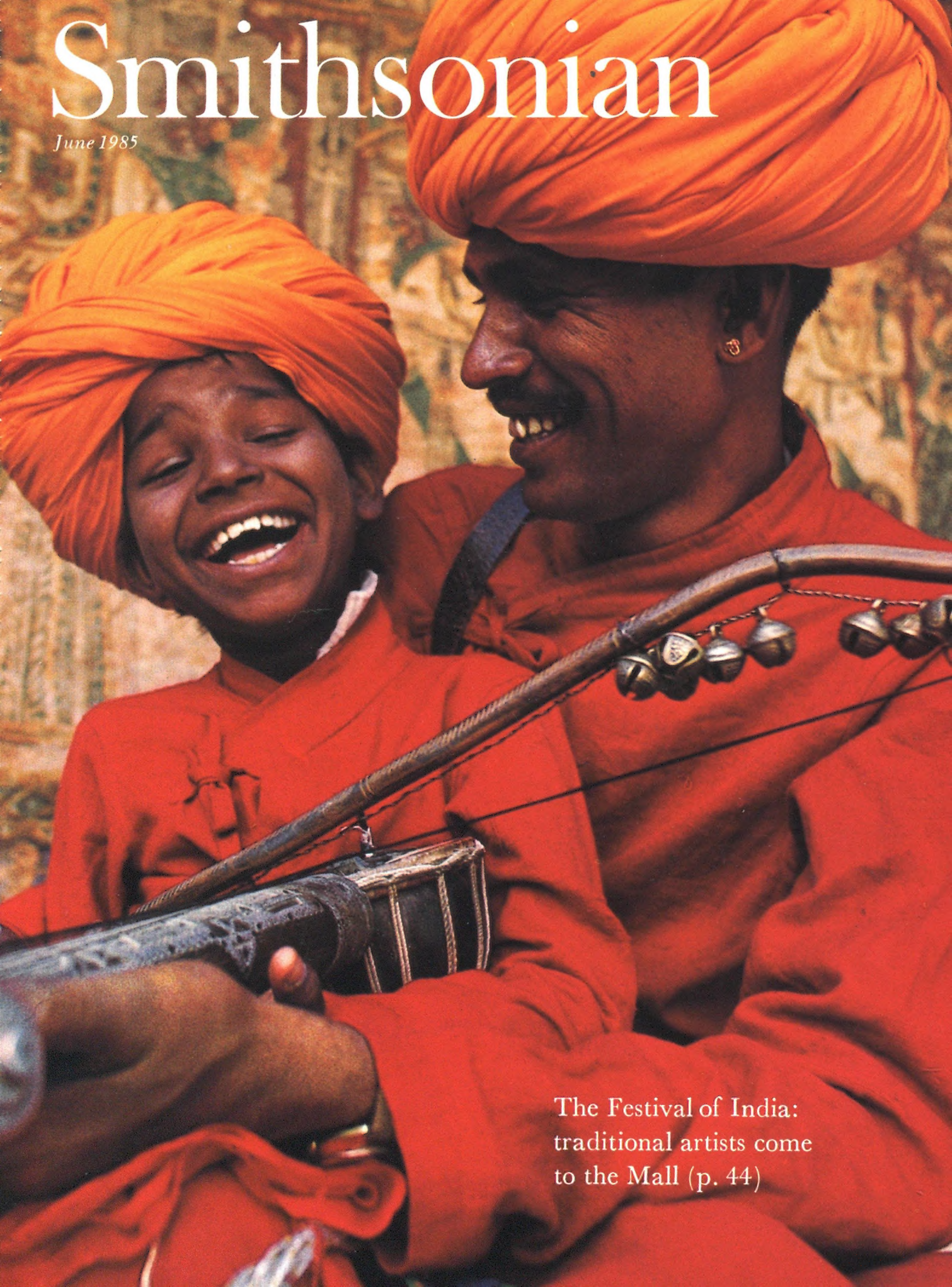
Smithsonian

June 1985



The Festival of India: traditional artists come to the Mall (p. 44)

Just a word about the price of The Glenlivet. Preposterous.

Is the premium we place on The Glenlivet really so outlandish? No more so than the premium placed on great vintage wines and fine champagne cognacs. The reason? Taste. Just one sip and you'll know that The Glenlivet has a taste that's without equal.

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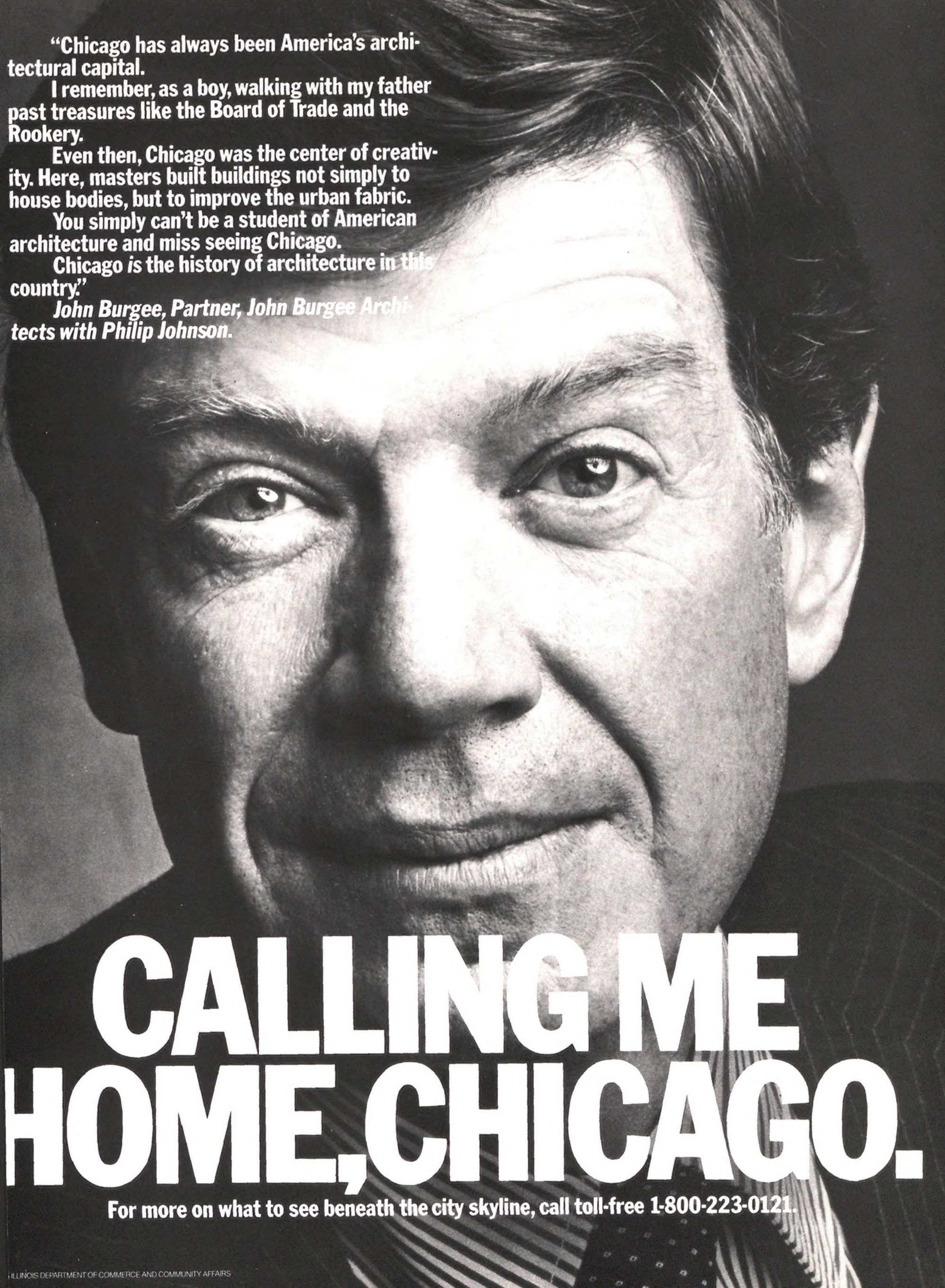

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His crew numbered exactly three and, at the moment, they were all busy transferring provisions from car to boat. Everyone, of course, had brought far more gear than needed, but thanks to the extra size of the Peugeot wagon, it was accomplished with no fuss. (There were questions as to whether the First Mate really needed an inflatable giraffe, but in time, this issue was settled.)

The important thing was that the entire crew felt relaxed and ready to sail. And no wonder—they had arrived by Peugeot.

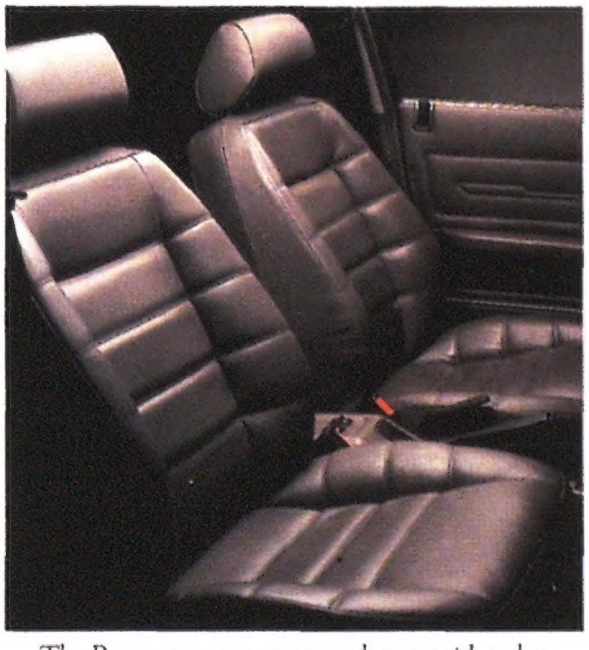
Peugeot's station wagons are also admired by land-bound critics. When the editors of *Motor Trend* compared imported wagons, they decided "The Peugeot [505S] won the comfort category hands down." (March 1984)

Among the comforts they liked best were Peugeot's unique orthopedically inspired seats.

But then, much about this Peugeot is unique. Because it's one of the few wagons designed *as* a wagon. This is not a sedan with new features welded-on, tacked-on, glued-on. Rather, everything—its special suspension, its steering, even its shock absorbers—works together to provide its "supple handling and sumptuous ride." (*Car and Driver,* May 1984)

Nor does Peugeot shirk on styling. A group of renowned designers recently selected a Peugeot wagon as one of the world's best-looking cars.

Besides all this, Peugeot wagons have yet another capacity: with their rear seat up, they offer a larger cargo



The Peugeot wagon surrounds you with sedan-like comforts. Soft, supple all-leather seats are available at extra cost on the 505 S.

area than any other wagon sold in America. Which can be a decided advantage when you have to transport a boatload of duffle bags, grips, staysails, wind scoops—and maybe an inflatable giraffe.

Peugeot wagons are available in *two* models, with gasoline or turbo-diesel engines and are priced from $12,440 to $17,965.* Call 1-800-447-2882 in the continental U.S. for the name of your nearest Peugeot dealer and a fact-filled brochure on the remarkable Peugeot wagons.

*Based on P.O.E. manufacturer's suggested retail prices. Actual prices may vary by dealer. Destination charges, taxes, dealer preparation, if any, and license fees are extra.

PEUGEOT

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June 1985

Smithsonian

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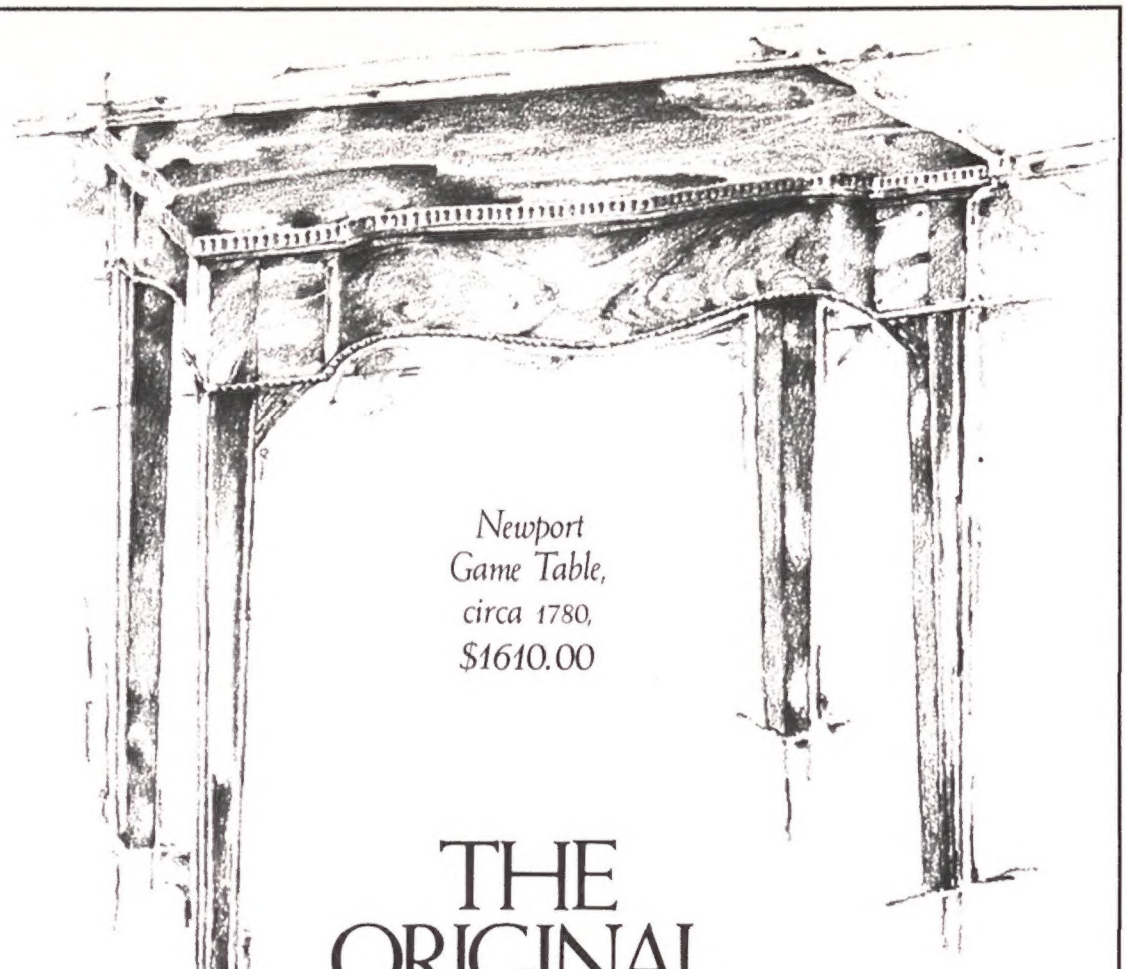

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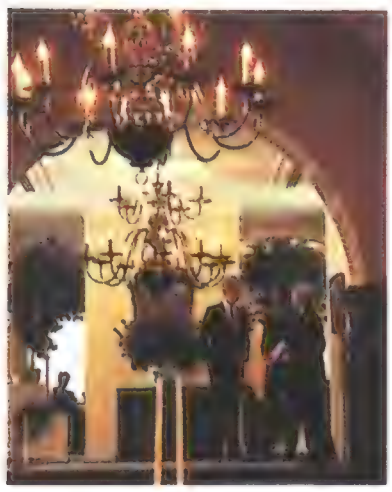
The Hay-Adams Chronicles

No. 1

(Authentic examples of the standard of service at the Hay-Adams Hotel.)



Our front-office manager, Mary, received an anxious call. A maid had found a forgotten piece of luggage. The guest was on his way to National Airport. Mary noted the guest's destination, guessed the flight time and airline, commandeered our limousine, and scurried to the Airport. Mary intercepted the guest and handed over the luggage. An extraordinary, once-in-a-lifetime event? No. All in a day's work.

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The *Brides of America* series spans more than two centuries. The costumes are historically accurate and meticulously tailored. The dolls are breathtaking.

Indeed, they should be! If ever there is a day in a woman's life when she looks her most beautiful, joyous, and radiant, that is her wedding day. There is no lovelier costume than a young woman's bridal attire. No other theme could have such enchantment, charm...and fascination.

For bridal attire has a history all its own – a history that will come to life in this collection as never before. Together, the twelve dolls in the collection will portray the different styles in bridal attire from colonial times to the present day.

Each doll's costume will be historically authentic and tailored by hand.

Each bridal gown will be authentic down to the smallest details.

And please note: Each doll will be costumed in *full* attire – gown, veil, petticoat, and pantalets and will be tailored by hand.

Notice the embroidery. The ruffled flounces. The floral appliques and corsages. Whatever is authentic and appropriate to the period is faithfully recreated. And wait until you feel the fabrics. The fine soft satin. The crisp starched linen.

Each doll will be made of fine imported porcelain – individually painted by hand!

Each doll will be expertly crafted of fine imported porcelain – head, hands, and feet – for the same delicate look (and feel!) of the famous collector dolls of the 1800's. Facial features will be exquisitely sculptured. And each doll will be individually hand-painted so that her complexion perfectly complements the color of her hair – which will be coiffed in the style of the period.

Each doll has her very own precious personality.

Each doll is a joy. And each is unique – endowed with a precious personality all her own. There's *Julia: A Victorian Bride*, whose gown features the fine embroidered lace so typical of the Victorian period. *Catherine: A Gibson Girl Bride* is dressed in a gown with high wing collars and leg-of-mutton sleeves. The gown is recreated from an actual Charles Dana Gibson design. *Betsy: A Bride of the Flapper Period* steps straight out of the roaring twenties. Notice the casual bob hairdo, the swept-back veil, and the straight-fitting drop waistline of her gown – all authentic to the period.

From the more distant past comes *Sarah: A Frontier Bride* dressed in an apron-style pinafore gown that's distinctly American in style. The embroidered bonnet, too, is typical of the period – the 1830's and 40's.

When completed, your collection will consist of twelve stunning bride dolls – each beautifully different from one another – representing more than two centuries of American fashion.

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With the display stand, you will be able to display each prized doll wherever you like – on a table or a shelf, on a mantle, or in a cabinet with your other prized collectibles.

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These American Bride dolls will be a source of lifelong pleasure – each doll will be an heirloom – treasured now and treasured for all tomorrows. Do mail your reservation today!

Sarah • Frontier

Betsy • Flapper

Shown smaller than actual size of 12" in height

Smithsonian horizons

The Institution, working with other agencies, is attacking worldwide ignorance about the role of insects

How important are insects in your ideas about the major components of museum collections and research activities? Probably you underestimate them, for there is a natural tendency to equate importance with size. The Insect Zoo, in the National Museum of Natural History, may be seen by relatively few of our visitors, yet the collections behind it include some 30 million specimens—almost a third of the total number of objects in all Smithsonian museums.

Those of us living in cities in the temperate zone generally can identify only a few broad types or species of insects, and we tend to think of them as little more than a marginal annoyance. Insecticides and various sanitation measures largely exclude them from our immediate environment. Yet even in the temperate zone their social and economic importance is vast: positively, by pollinating crops or attacking other pests; negatively, by threatening our health or food supply. In an evolutionary sense, they are Man's only significant competitors.

The view one forms of insects in the tropics is something else again. Anyone who has seen a train of leafcutter ants on the march, each tiny organism carrying its fragment of leaf like a great flag, is conscious of an awesome force not easily deflected (SMITHSONIAN, October 1984). It has been suggested that ants and termites alone, in some wet tropics, may constitute as much as half of the total animal biomass. And the variety of insect life is staggering. His studies of tropical forest canopies have led the Smithsonian's Terry L. Erwin to revise upward the number of insect species from 1.5-10 million to as many as 30 million.

It follows that the tropics are central to the study of insects. It is there that the largest, most complex and specialized insect societies are found. And many, even, of our temperate-zone insect pests are of tropical origin—not only such comparatively well-known examples as the boll weevil and the fruit fly, but hosts of others as well—including some mites so small that they lay their eggs in the proboscises of honeybees.

The Smithsonian's systematic collections of insects are a priceless resource, whether one is concerned with advancing knowledge about their contribution to the aggregate of life or with countermeasures to assume that we continue to prevail over them. Hence the Museum of Natural History has long housed other specialists working alongside our own Department of Entomology. There is a mosquito biosystematics unit from Walter Reed Army Hospital, a tick group from the National Institutes of Health, and a flea project under the sponsorship of the University of Maryland. Oldest and most important is our relationship with the Department of Agriculture, which effectively launched the Smithsonian into the field with a transfer of its collections to us in 1881. What has developed is, in fact, a closely cooperating staff that makes no effort to maintain the artificial line between fundamental taxonomic research and the needs of applied programs. Today this productive symbiosis, although increasingly jeopardized by cutbacks in some programs, continues to operate at the Smithsonian.

Reassuring as this may sound, there are dangers in an attitude of complacency. Professor Daniel H. Janzen of the University of Pennsylvania, currently at work on the moths of Costa Rica, derides the present scale of our efforts as dwarfed by the rate at which the tropics are "sliding down the craw of human consumption." He believes that we need to double our capacity to process incoming collections, among other things. Above all, he urges us to recognize that the continuing destruction of entire tropical ecosystems is threatening to become an irreversible loss to human knowledge as well as to well-being. At his urging the Entomological Society of America has formally recognized the Smithsonian as "the logical focus of leadership" for an attack on our still very substantial, worldwide ignorance of neotropical insects.

Our present collections, large as they are, are thus only the tip of an iceberg. While having the responsibility to order, conserve and exhibit them, we must never lose sight of the fact that yet greater needs and treasures still demand our attention.

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Letters to the Editor

Hadrian's Wall

Dear Sir: We shouldn't be surprised if our Canadian neighbors start building a Hadrian's Wall, if Timothy Foote, in your April issue, is correct in describing the purpose for the original one.

It appears to me that the United States now pretty much falls into the category of what he envisions as contemporary barbarians: ". . . hard-rock groups and street gangs, much given to blood feuds and mind-bending substances, entirely bereft of art, police or plumbing." Well, perhaps we do have plumbing. . . .

L. G. Harvey
Shawnee Mission, Kansas

Dear Sir: I was fascinated to see, on page 77, a picture of a Roman spoon. My grandfather, Thomas Richard Williams, was a member of the North of England Excavation Committee which was responsible for finding this spoon at Benwell in 1926, and we have always had, as a family memento, a replica of it.

My father used to tell me that the pointed handle was designed so that the user could spear his food as well as use the bowl of the spoon.

Penelope Reinders
Georgetown, Connecticut

Parrots

Dear Sir: Wildlife enforcers are justified in holding up shipments of parrots, but the Department of Agriculture's wholesale "depopulation" of seized birds by gassing them to "protect" thousands of chickens crammed into a typical poultry factory is inexcusable. Other means to

Washington, 1918. A tradition takes shape.

Almost a century ago, a man named Walter Scott Lenox began to realize his ideal of making the finest china in America. It was his dedication to perfection and pride in his craft that attracted the attention of Woodrow Wilson in 1918. President Wilson ordered a Lenox China service of 1,700 pieces for the White House, the first such American made service.

Since that time, Lenox has provided new Official State Services of china for the White House. During the Thirties, President Roosevelt commissioned Lenox to develop a special service. Years later, President Truman called upon Lenox again. And most recently, in 1982, Lenox completed a new service for the White House.

What is most remarkable about these services is not the inherent prestige in gracing the most prominent table in our land, but rather that the very same quality china is available to everyone. Of course, the actual White House patterns are unobtainable. Yet all the care and artistry that go into the Presidential Services go into every single piece of Lenox China.

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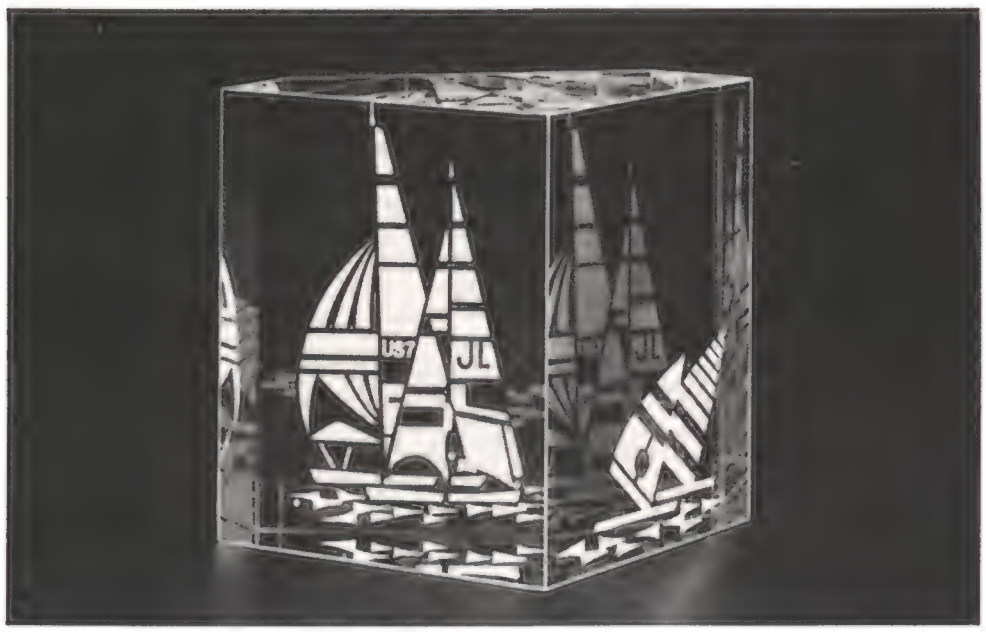

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protect poultry exist, not least of which is allowing their basic needs of space to move in, earth to stand on, natural light instead of 18 hours of artificial light.

As to intelligence, Konrad Lorenz writes that parrots, along with ravens and crows, are "probably the only birds to suffer from boredom owing to their mental alertness."

Marquita Hilt
Carrollton, Georgia

The Department of Agriculture holds seized birds in a quarantine station for 30 days. If they are disease-free they are auctioned off; if diseased, they must be destroyed. Ed.

Dear Sir: I am *so* angry and upset. I waited all day to relax in bed with my SMITHSONIAN and the first picture is that poor dead little bird! How could you people do that? I started to cry. Those of us who are trying to alleviate the suffering of animals sometimes have to read the ugly, sickening details, but why grind our noses in the pictures?

Mrs. B. Taylor
Lakewood, California

Vision

Dear Sir: As an educator, I constantly deal with children who have had inadequate visual experiences. I firmly believe that this is at least a contributor to the problems of the nonreader. I work in a nearby school system with many children who do not even have a daily newspaper, let alone a magazine, an encyclopedia, even a dictionary or, for that matter, any book in their homes.

I see the results of this in nonreaders, poor readers, poor visual perception, inability to organize written materials in a meaningful way and poor language skills. It takes a lot to overcome or compensate for those early years' deprivation. National and statewide programs attempt to reach these children, but in all honesty we are not doing enough.

Katharine L. Breece
Virginia Beach, Virginia

Boston Latin School

Dear Sir: I feel that Mr. Wernick has been unfair to a very fine teacher: John Cray. Under him the *Aeneid* became a study of other fields of knowledge. Highly intelligent, with an enormous fund of miscel-

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laneous knowledge, he instilled in students the excitement of learning.

Instead of irregular verbs we went into such matters as the River Meander—how its name was taken over into geology, the nature of the river cycle and its importance in geography; theories of the Gate of Horn and the nature of the underworld in classical and Christian thought; the physiology of ovines in terms of their classical names; the civilization of Carthage; and even what happened in the cave between Dido and Aeneas. These are a few of the topics that have stuck in my memory for nearly 50 years.

Cray could be sarcastic with lazy boys, but the cutting remark was always delivered with a smile that took out the sting.
Everett F. Bleiler, '38
Ridgewood, New Jersey

Dear Sir: Not every Boston Latin graduate with a look of soulful longing is Bernard Berenson. The silky-bearded figure at upper right on page 125 of my article came not from Lithuania but from old Boston. He is Edward Everett Hale, class of 1835, clergyman, lecturer and author of a shelf full of best-sellers, now forgotten. (His most famous foray was *The Man Without a Country*.)
Robert Wernick
Paris

Bernard Berenson in 1877

Cecil Sharp

Dear Sir: It was Mrs. James Jackson Storrow's appreciation and financial support that brought Sharp back to America.

His meeting with Boston-born Olive Campbell, a dear friend of Mrs. Storrow, took place in Lincoln, Massachusetts, at Storrow Farm. Parties and performances

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were held in its natural amphitheater. On the big open-air floor, aptly named "C#," we danced all day and much of the night to tunes collected or transcribed by Cecil Sharp, while following his detailed descriptions for steps and figures of Country, Morris and Swords.
Edith Ballinger Price
Virginia Beach, Virginia

Dear Sir: It is worth noting that Sharp had come to this country with Granville-Barker's Shakespeare company, to direct the music Sharp himself had composed on folk themes for *A Midsummer Night's Dream*. He was also music tutor, 1904-07, to the Prince of Wales, later Edward VIII.
Ralph Rinzler
Washington, D.C.

Phantom division

Dear Sir: General Allenby's victory in Palestine in the Great War of 1914-1918 is a good example of the deliberate application of ruse.

Secretly concentrating his forces on the western flank, Allenby persuaded his Turkish foe that an attack would be made in the Jordan Valley to the east. There, new camps sprang up while the few remaining troops marched to and fro in long, extended columns. By day, clouds of dust were raised by mule-driven sleighs; at night, campfires burned brightly, and 15,000 canvas horses stood realistically, if silently. In the rear, a Jerusalem hotel was requisitioned, provided with sentries and sentry boxes and labeled "Advance Headquarters." Elaborate public arrangements were made for the cavalry staff to hold a race meeting on the day the attack was to begin.

Later examination of the Turkish intelligence reports showed that deception was complete, a factor which contributed directly to the ultimate victory.
David N. Goodson, M.D.
Roy, Washington

Dear Sir: The illustrations accompanying your story suggest that the men of the 23rd encountered the effects of a time warp while serving in France. The railroad car under which two men took shelter from shellfire was equipped with roller bearings of a type first generally used in the late 1950s.
James H. Tate
Cumberland, Maryland
Mr. Tate is correct. Ed.

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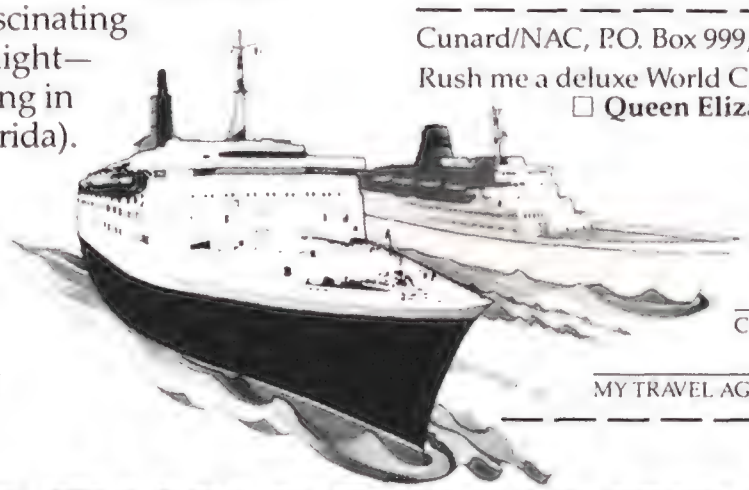

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Around the Mall and beyond

Nothing adds more class to an otherwise humdrum Smithsonian office than an Oscar. A number of staffers in the Arts and Industries Building can vouch for that. Right after the April Academy Awards they almost formed a procession up the street to the second-floor domain of the Office of Folklife Programs. There, in the unremarkable working place of a highly remarkable person, they saw, standing on a plain, government-type desk, an honest-to-God Oscar. They would, with permission of its owner, touch it, heft it, finally clasp it to them as friends took photographs.

Then, reluctantly, they would return it to the desk of Marjorie Hunt, who is still not quite sure the Oscar is really hers. It is, and so is Paul Wagner's his, though you won't see it in his office. He keeps it at home in a drawer full of socks because he's paranoid about losing it somehow. "It's not the value," he explains. "It's not solid gold or anything. But it's the disgrace. What would I say when people asked to see it? 'Well, I . . . um . . . sort of can't find it. . . .' "

Marjorie and Paul won their Oscars as coproducers of 1984's best documentary short film, *The Stone Carvers*. You probably haven't seen it because so far it's only been aired locally. Now, of course, everyone's interested—Public Broadcasting Service, Home Box Office, National Geographic's cable service. (PBS will air the film nationally on July 4; check local listings for broadcast time.)

It's the story of the artisans who have worked in some cases for two generations on the great buildings of Washington, especially the National Cathedral. Statues in cathedral niches and reliefs in the

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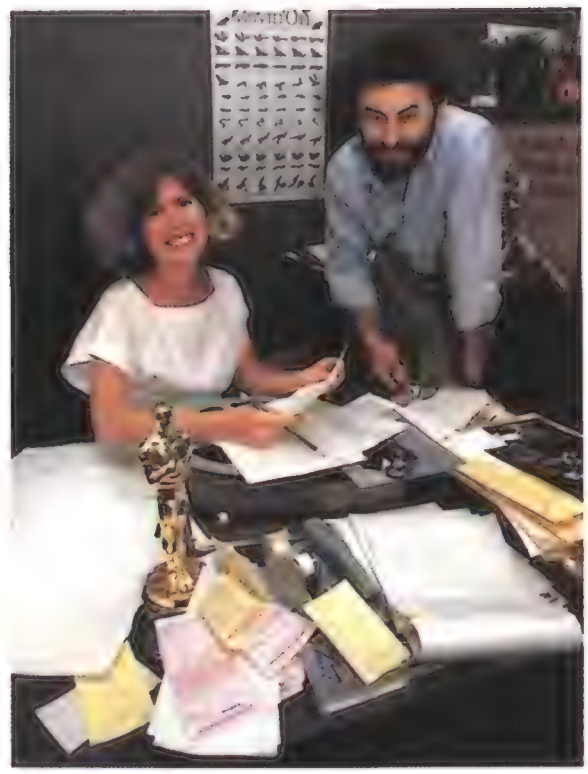

Marjorie Hunt, Paul Wagner and Oscar savor pictures of recent award ceremony.

porticoes of government buildings are the work of the stone carvers, almost all from Italy, still the fountainhead of their craft as it was in the days of Michelangelo.

The award-winning film emphasizes the pride—almost the sense of ownership—that the carvers feel for their work. Each figure, each device (almost out of sight on some lofty pedestal or buttress), each finial or corbel or crocket or boss or gargoyle, becomes a sort of signature for the person who chiseled it from the stone. Sometimes it is a carved reference to a private story or joke that only the carver recognizes. Now, a new, small carving is being done on the cathedral. An Oscar.

The stone carvers foresee the end of their craft. Not many apprentices hear the call or seek the old excellence. In the film, one carver recalls working for a legendary maestro and, one lunch hour, furtively borrowing one of the expert's favorite tools just to see if it would improve his own skill. When the master returned and missed the tool, the apprentice admitted that he had tried it—and awaited the angry words. Instead the old artisan said, "It makes my heart feel so good" that a youngster should care so deeply for the work.

Marjorie Hunt, a surging enthusiast with an irrepressible grin and an impeccable eye for a film subject, came to the Smithsonian from the University of Pennsylvania. She was then a PhD candidate in folklife, and brought the carvers to the

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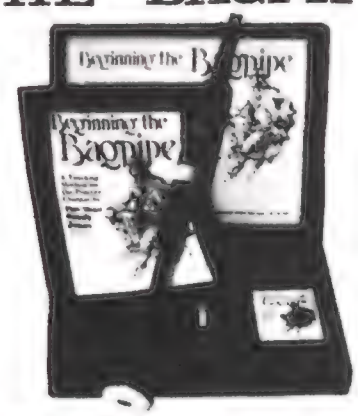

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Smithsonian's Festival of American Folklife in 1978 and 1979. Soon after, she signed on with the Office of Folklife Programs as a staff folklorist and is now completing her dissertation on stone carving.

At the festival, the carvers did their stuff for large audiences, then told stories about their work. Marjorie watched as Roger Morigi, a retired master carver, pointed to a reclining goddess adorning a gable of the Department of Commerce building. "See that figure?" he asked. "I did that."

"And the audience gave him a standing ovation," Marjorie recalls. That's when she realized that these people, with their ancient craft on the ebb, should be caught on film. Her Smithsonian colleagues, including Ralph Rinzler, then head of Folklife Programs, entirely agreed.

Enter Paul Wagner, who also studied at Penn and is now an independent filmmaker in Washington, working on contract for the Smithsonian. A few years ago he produced for the Folklife Program that memorable documentary on Pullman porters, *Miles of Smiles, Years of Struggle*, and also a film on old-fashioned medicine shows, *Free Show Tonite*, which you may have seen on PBS by the time you read this.

Wagner, slender and dark-bearded, has seen a lot of enthusiasms dribble away in the cold light of such things as money, practicality, human temperament and endless delay. But Hunt's stone carvers were a natural. Money came from the Folk Arts Program of the National Endowment for the Arts, from the Morris and Gwendolyn Cafritz Foundation (two of whose pet projects happen to be the National Cathedral and the Smithsonian Institution), and from the D.C. Community Humanities Council. The carvers cooperated with characteristic flair. The film was produced with a budget of $67,000—hardly enough to clean the lenses in many Hollywood productions.

About four years after its conception, *The Stone Carvers* premiered at the Baird Auditorium of the Natural History Museum in front of an audience of 550 people, "including," says Hunt, "about 200 Italians"— families and friends of the carvers. The whole thing turned into a lovely ethnic party, with a huge spread of traditional food under the rotunda and music by an Italian-American band.

"Since then," adds Wagner, "we've had

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a party every time the film has taken a giant step—when it was first aired, when it was chosen for Washington's PBS. Then, of course, there was the Oscar."

The Stone Carvers came to the attention of the Academy of Motion Picture Arts and Sciences when CINE (the Council on International Nontheatrical Events) awarded it a Golden Eagle, qualifying it to be shown in international film festivals—and instantly putting it in the running for an Oscar nomination.

Marjorie says that when the paper came out with the Oscar nominations, she put her hand over the list of nominees, not peeking until she had read down to it.

"It didn't give our names," Paul says. "We wondered if there was another film on stone carvers." "Or was it a typo?" Marjorie wondered. "Did they mean *The Stone Cravers*?"

Ten days later the announcement letter arrived. Then, two weeks before the ceremony, the pair was invited to Hollywood for a get-together with all the nominees. "It sounds funny," Hunt says, "but we flew to Los Angeles for lunch."

They recall it as a classy affair where they were told, "Right now, everyone's a winner," where the names of all the nominees were read as certificates confirming this were handed out, and where there was no such thing as stars.

Then came the awards ceremony. Everyone has read about this Hollywood rite of passage—the build-up, the tension, the hype—but when it happens to a couple of nice people from the Smithsonian you seem to hear it for the first time. The two went to the Coast early for briefings and receptions. They were told that if they should be called onstage to receive an award they would be given 45 seconds to make their acceptance speeches. After 30 seconds a red light would flash *once*. After 40 seconds it would *blink*. At 45 seconds it would stay *on*. "They threaten that if you don't stop talking," Wagner says, "they'll bring the music up and drown you out."

They showed me a videotape of the event. Michael Douglas (*Romancing the Stone*) reads the list of nominated films, then speaks the fateful words: ". . . *And the winner is . . .*" And at "*The Stone Carvers*" a delighted shout ("from my family," says Hunt) leads the applause, and a minor explosion ("We shot out of our chairs like rockets!") shakes the hall.

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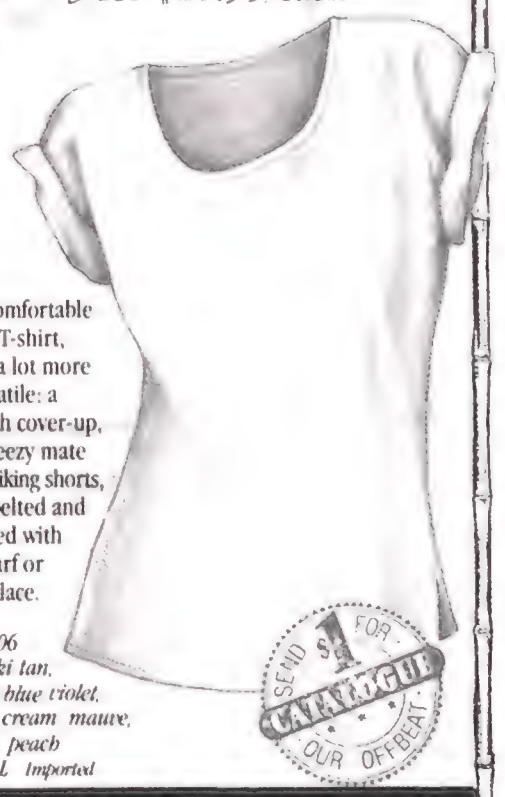

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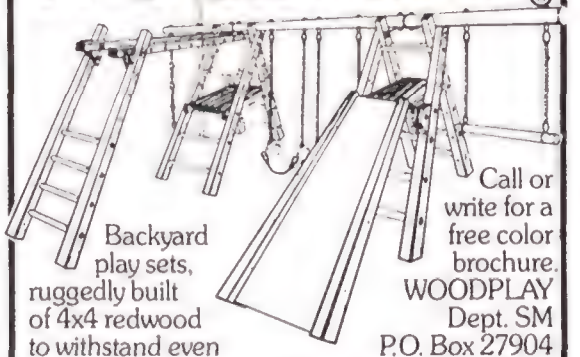

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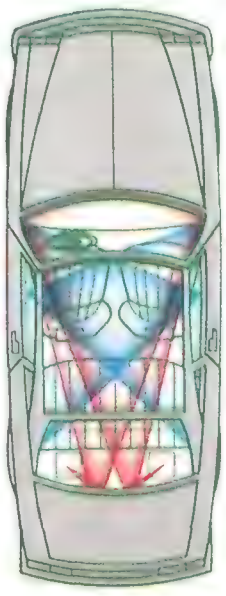

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Stone carvers Frank Zic, Roger Morigi and Vincent Palumbo found their niches working on the National Cathedral, here, and other Washington buildings.

Then there they are, breathless and beaming, clutching their Oscars, bending to the microphone. "We want to thank. . . ." Nicely organized; gracefully spoken.

Wagner says he wanted to thank the Chinese restaurant in Washington whose fortune cookies, during the previous week, had all agreed that for him success was on the way. "But the red light was blinking," he adds.

A rule book comes with the Oscar, making it clear that it's bad form to hock it. You can sell it back to the Academy, but you'll only get ten bucks for it. You should keep it safely. Paul thought a safe place was under the sink, but the idea of an Oscar in there with the Drāno jarred him. Hence the socks drawer.

It's a hard act to follow. "Perhaps we're in for 35 years of acute depression," says Paul. But Oscars are great at opening doors. He and Marjorie already have a grant to produce a film with New York folklorist Steve Zeitlin: *The Grand Generation*. Paul says it's about the cultural role older people play—or should play. I'll watch for it; that's my crowd.

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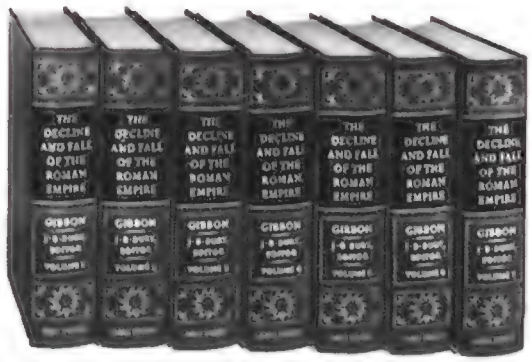

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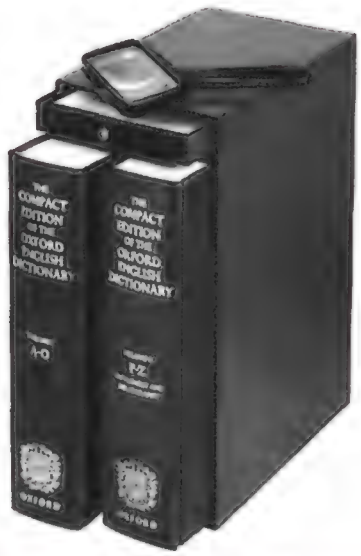

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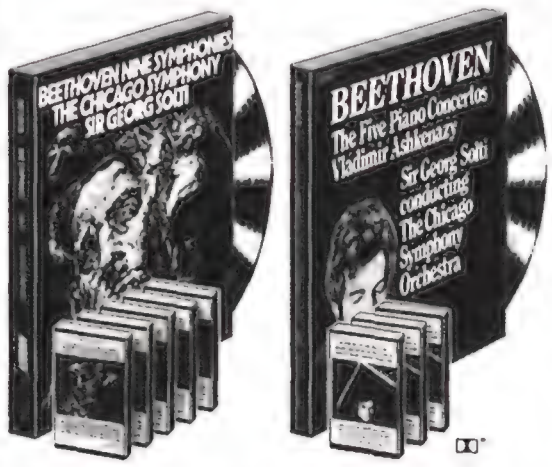
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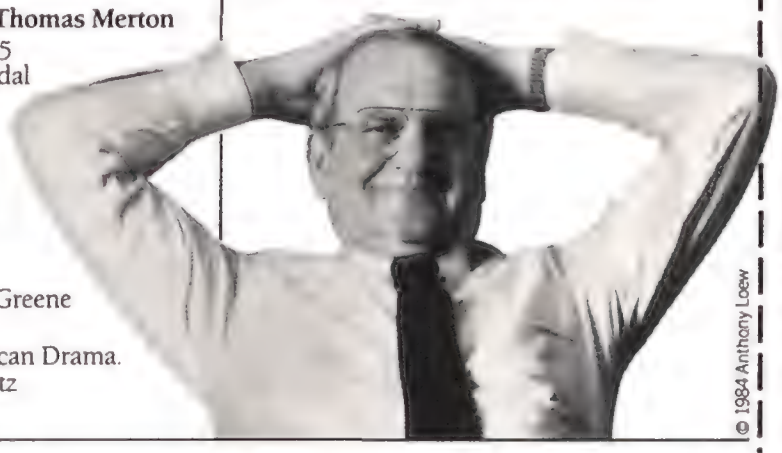

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Phenomena, comment and notes

An idea ignored back in 1907 offers insight into why we contort our faces in the many ways that we do

Every once in a while an idea comes along that seems to explain so much that you just want it to be right. And if it has the added attraction of human drama, as with an idea that originally sank without trace only to be rediscovered nearly 80 years later, so much the better.

This is happening now to a book published in 1907 in Paris that was ignored at the time and has been ever since. The book was *La Physionomie Humaine: Son Mécanisme et son Rôle Social* (Human Physiognomy: Its Mechanism and Its Social Role), the work of a physician named Israel Waynbaum. Now in 1985, it has been reclaimed from oblivion by R. B. Zajonc, a professor of psychology at the University of Michigan. In a full-length article in the April 5 issue of the journal *Science*, Zajonc contends that Waynbaum's ideas form "a promising basis for a comprehensive theory of the emotions." They also turn intuition on its head.

The central idea is that human facial expressions are primarily a means of controlling blood flow into and out of the brain, and only secondarily a means of communication. The human face has far more muscles (about 80) than would seem necessary. Contracting those muscles squeezes the arteries and veins that carry blood to and from the brain. These muscles act as tourniquets in the right places, either to keep the blood supply in the brain steady while that in the rest of the body is experiencing wild swings, or to alter the brain's blood supply and thus, to a limited extent, its functioning.

When we smile or frown, it seems, we are not just expressing our mood to the outside world. We are adjusting our own cerebral blood flow to match the situation we are in. Rubbing our forehead or chin, it would appear, really does help us think.

Blood ascends to our head through the common carotid, a large artery near the windpipe that paramedics often check for a victim's pulse. Near the top of the neck it branches: the internal carotid carries blood to the brain, the external to the face and scalp. According to Zajonc, Waynbaum thought that contracting facial muscles would reduce blood flow through facial arteries. Less blood could go through the external carotid, so more would go up the internal into the brain.

This part is not so clear today, because we know more about the complicated and redundant system that regulates the flow of blood to the brain. But Waynbaum's ideas may still work for the veins that carry blood away from the brain. These come down the forehead and face, and

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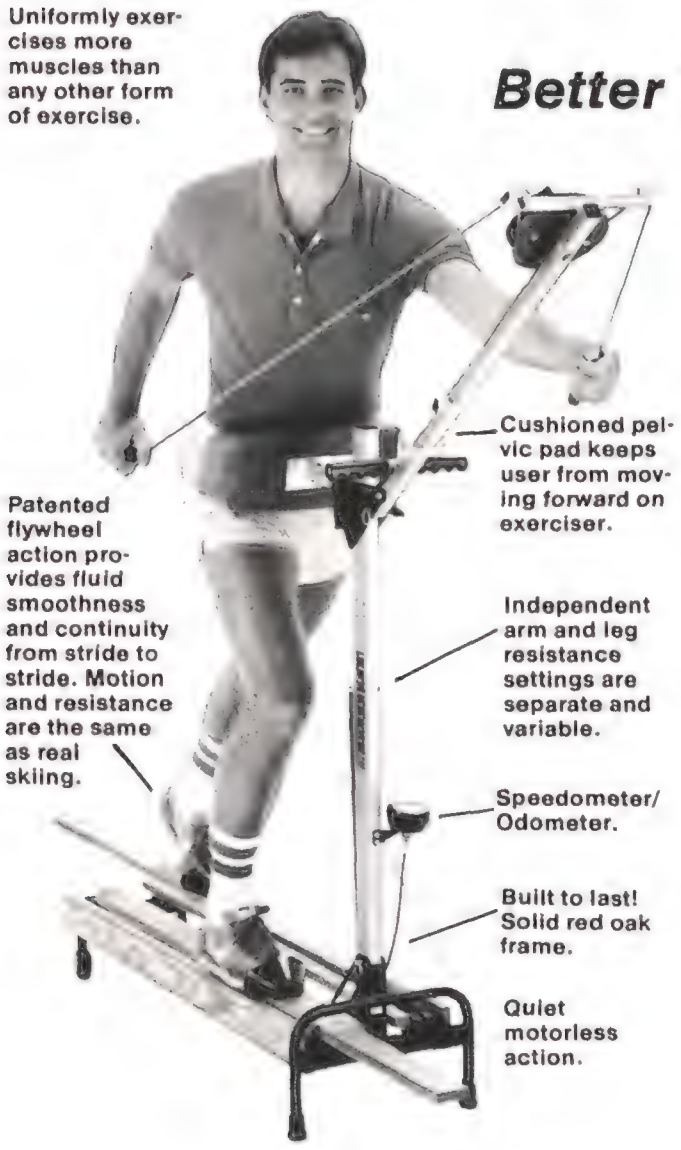
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muscular activity can squeeze them tight. Everybody has seen the veins standing out on the forehead of someone who is making a mighty physical effort or who is in a rage. (In fact, Zajonc points out, you can make those veins stand out at will. Pull the corners of your mouth apart, as if in an exaggerated smile. Several seconds later the veins will begin to pop out.)

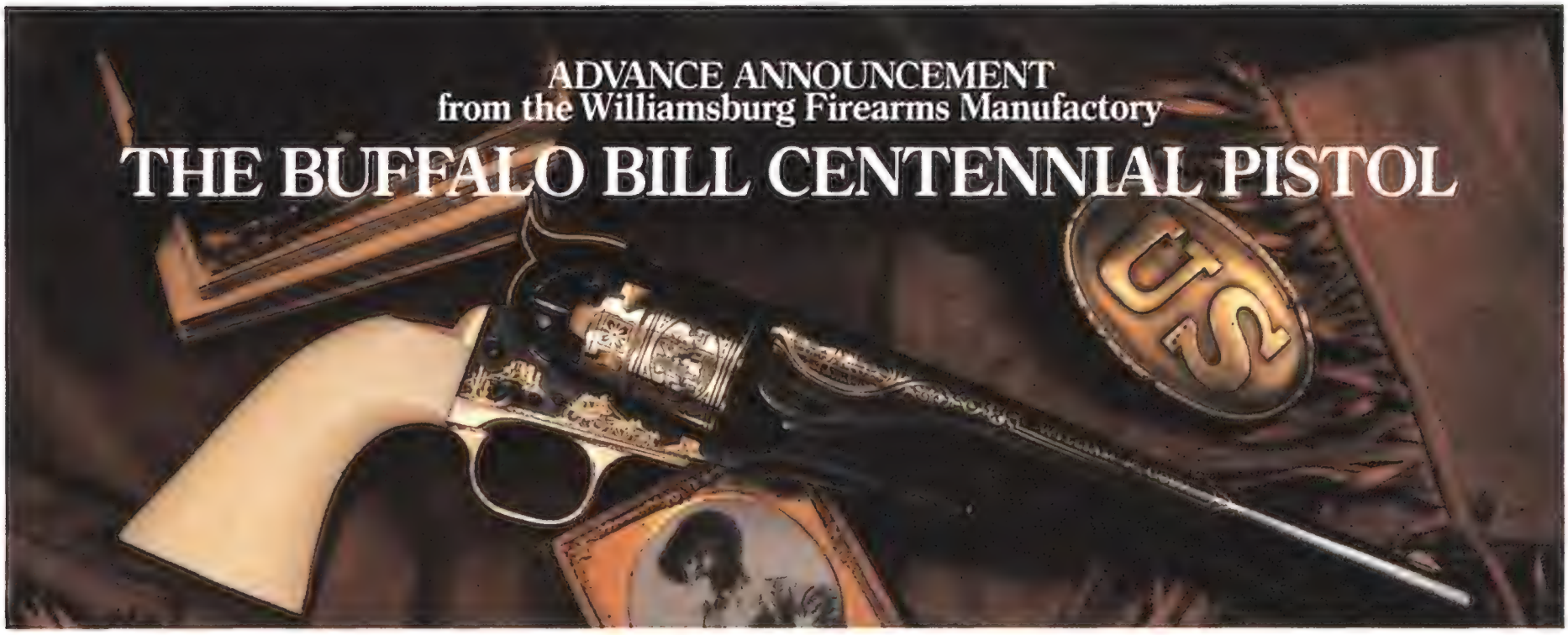
What happens internally is more important. Those gorged veins slow the normal draining of blood from the brain, leaving it bathed in an unusually rich supply. The cells and tissues receive more oxygen, causing a feeling of heightened aliveness. We have all seen someone laugh until they were red in the face.

A baby's expression may tell us only that it is adjusting its cerebral blood flow.

Waynbaum hypothesized that more blood in the brain enables the brain to work better (an idea borne out by research 60 years later). Therefore, he thought, we furrow our brow when we concentrate to divert more blood to the brain by reducing the flow of blood to the face and also by slowing down the blood leaving the brain. For the same reason, when we are stuck on a problem, we may rub our chin or our forehead, push on our face around the eyes, frown, or even pull our earlobes —squeezing blood vessels wherever we can. Crying can do the opposite. Blood flow to the lacrimal (tear) gland, fed indirectly by the internal carotid, increases at the cost of blood flow to the brain, also fed by the internal carotid, which has now had much of its flow diverted. Cerebral blood flow is reduced, causing a degree of anesthesia.

Waynbaum went too far, perhaps, in asserting that a smile precedes the feeling of happiness. But even this idea, according to Zajonc, is not as far out as I would have thought. The brain, it seems, generates heat just as a computer does, and is cooled by arterial blood. Brain temperature is important because any changes are likely to affect the activity of neurotransmitters (chemicals released at nerve endings that stimulate or inhibit the firing of muscle or other nerve cells) and enzymes basic to its function, and with those our subjective states. Zajonc says it is not likely that facial muscles can do this simply by controlling the blood supply. But it is possible, he says, that the simple act of contracting facial muscles may directly stimulate blood flow in the part of the brain that controls them, thus changing the temperature in that part of the brain and the synthesis and release of neurotransmitters as well.

We blush, Waynbaum said, when intense emotions send blood rushing through the main artery in situations where we cannot do anything. Just as in a suppressed rage, the blood has nowhere to go. Facial blood vessels take up the sur-



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plus, and we turn red. The opposite, the pallor caused by pain, occurs when we grimace with our mouth and eyes, diminishing blood flow to the face and diverting it to the brain. Zajonc adds: "Waynbaum's faith in his theory led him to assert that if the main carotid branched off not at the neck but at the shoulders, we would express our emotions with our arms, and blush with our shoulders."

Someday we may put these ideas to use. If we really can influence our moods by flexing our facial muscles, thereby aiding the secretion of certain neurotransmitters, then depressed or anxious patients could learn to use those muscles to pull themselves back into more positive states. Yoga and some forms of meditation are based in part on such ideas, Zajonc says, but he is cautious. It is not clear, he says, that the voluntary movements of facial muscles have the same effect on blood flow in the brain as do spontaneous ones.

Zajonc ends with the opinion that Waynbaum's "basic idea is ingenious and rich in consequences." But how should I feel when somebody gives me a great big smile, and I realize that they are really only adjusting their cerebral blood flow? *John P. Wiley jr.*

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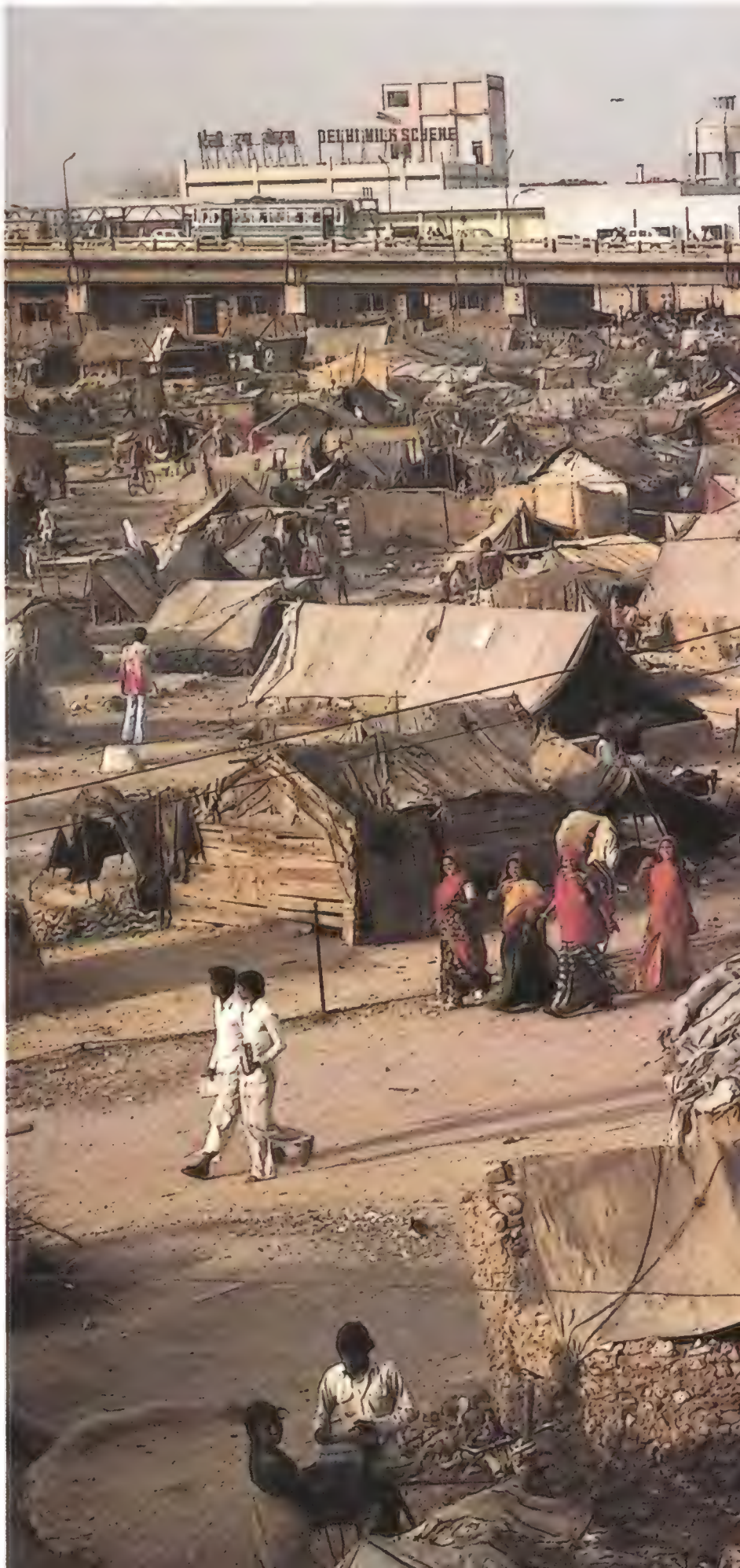
By Veenu Sandal

India's traditional folk artists fight for a place in the future

Young acrobat, who came with parents to Shadipur from a Rajasthani village, balances tumbler on head.



Sprawling slum at Shadipur Depot in Delhi houses traditional performers, who seek title to the land.

Photographs by Raghubir Singh and Mary Ellen Mark

Displaced from the countryside by TV, movies and industrialization, the wandering performers seek a niche in the big cities

Outside a ragged tent beside a bridge in New Delhi, a man was floating in the air, about seven feet off the ground. In the shade under a mango tree, a rat was learning arithmetic while a Himalayan black bear danced and clapped happily. A pretty young girl picked up coins with her eyes and a precariously balanced woman fried an egg on her head.

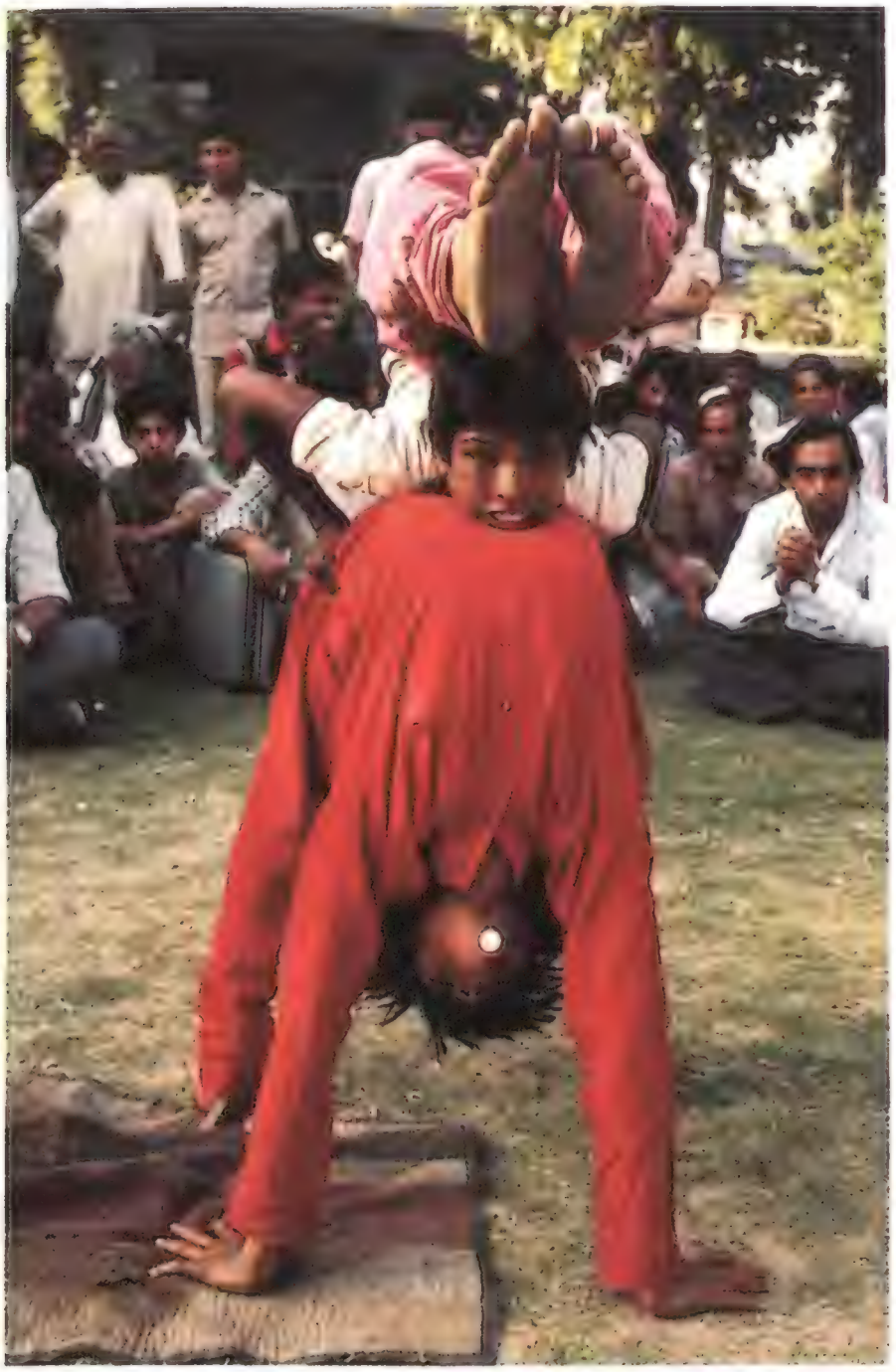
Within an hour, they had disappeared. "They've gone on a round of the city, in search of crowds," ex-

plained a man clasping a puppet in his hand. "Like me and others here, like their fathers and forefathers before them, they live by their arts and skills. It isn't easy —not anymore. I, Bala Bhatt, should know; for I was one of the first to come here on the run, pitch my tent and make this home."

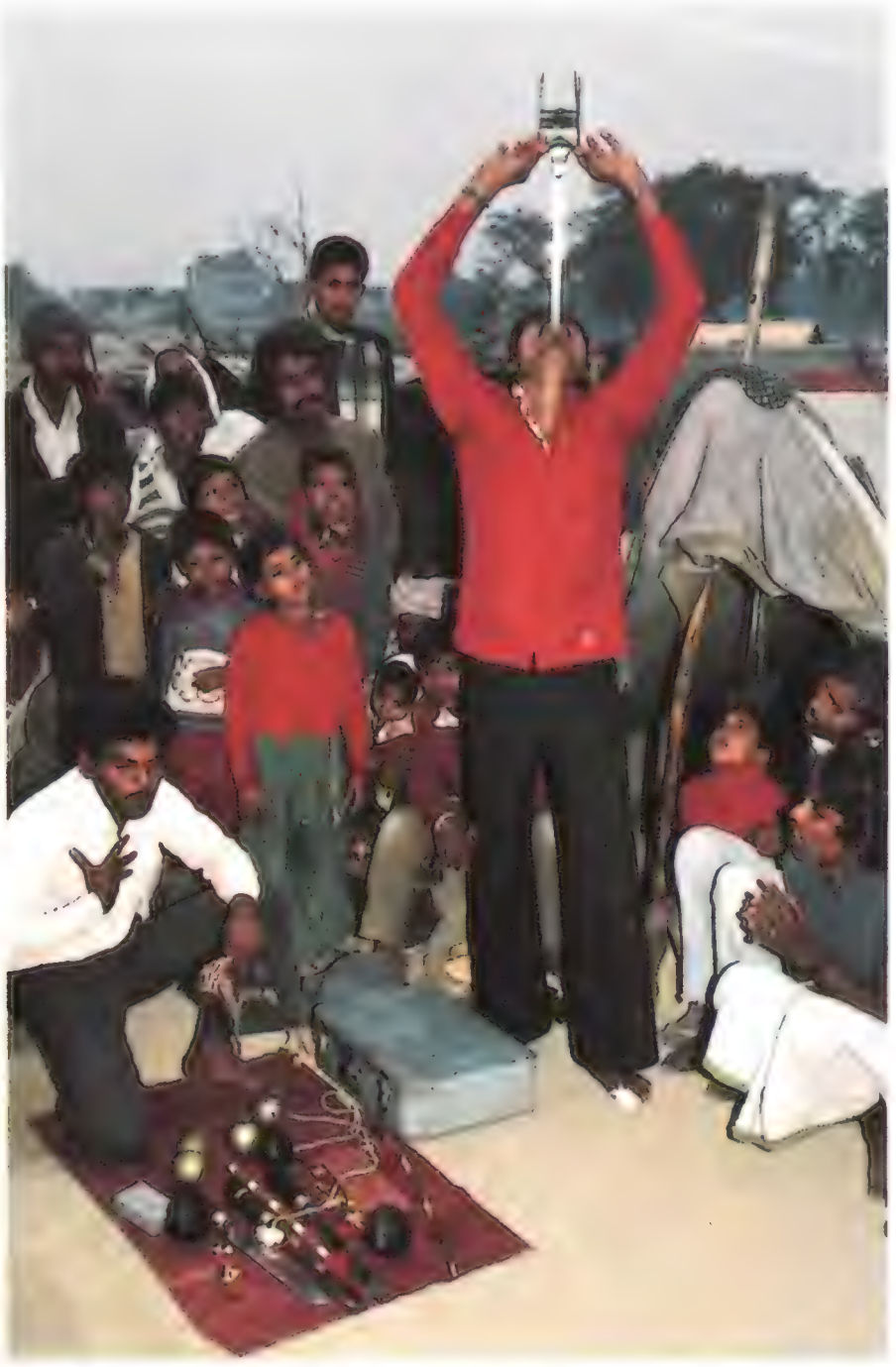
Bala's tattered tent is at the center of a remarkable slum settlement in a West Delhi neighborhood called Shadipur. The 350 tents and mud-and-thatch huts are home for 3,000 jugglers, street magicians, balladeers, puppeteers, snake charmers, acrobats, folk dancers, impersonators and monkey trainers, and a host of other performers from throughout India.

This month, many of them will be performing at the Smithsonian in two Festival of India activities—the Folklife Festival on the Mall and the "Aditi" exhibition at NMNH (see page 179 for more information). With all the recent interest in India generated by movies and TV series, these traditional artists should find a warm reception. They have worked hard for this; in recent years, the lives of these low-caste, wandering performers have been filled with struggle. But now their gifts are being recognized once again.

Uneducated in the formal sense, many of these artists are blessed with phenomenal memories. Bala Bhatt and his older brother, Sagar (p. 51), can narrate more than 50 stories for their large company of marionettes—court dancers, musicians, a horse stunt rider and a galaxy of other folk heroes. With a jerk of their fingers and the beat of a drum, the two brothers make kings talk and soldiers fight on a dusty battlefield. "But we wouldn't be able to do this," confides Bala, "if we hadn't fought hard to save our puppets. If we'd lost our nerve, you'd have found us in the poorhouse."



Two boys show acrobatic prowess at Khan Market in Delhi; both will perform on the Mall this summer.



Juggler and sword-swallower from South India share an act at Shadipur; juggler will be at Smithsonian.

The puppeteer families at Shadipur remember in vivid detail their first day of trouble in the city. It was 1956. The monsoons were particularly bad that year, and on this morning it was raining heavily. At the time, the puppeteers were squatters on a vacant lot in Old Delhi. "We were sitting huddled inside our tents when truckloads of baton-wielding policemen and laborers screeched to a halt on the roadside," says Bala. The policemen ordered them out in 15 minutes, and told the laborers to start pulling down the tents. Amid the screaming of terrified women and children, the men tried to save their meager belongings, chiefly utensils and puppets.

"We didn't have the money to hire taxis or auto-rickshaws," Bala recalls. "We had never boarded a bus. Some of us ran to arrange for tongas [horse-drawn carriages] and cycle rickshaws. Because it was raining and the roads were slippery, the drivers demanded double the normal fares, but we just piled into them. Every patch of vacant land in Delhi was waterlogged that day. There was nowhere to go. We just went round and round." Bewildered, wet and shivering, the puppeteers finally occupied a rocky piece of land and braved the rain, only to be faced with a new problem. They had pooled all their ready cash to pay the tonga and rickshaw men. Now there was no money left for food and no place in the rain to put up a show.

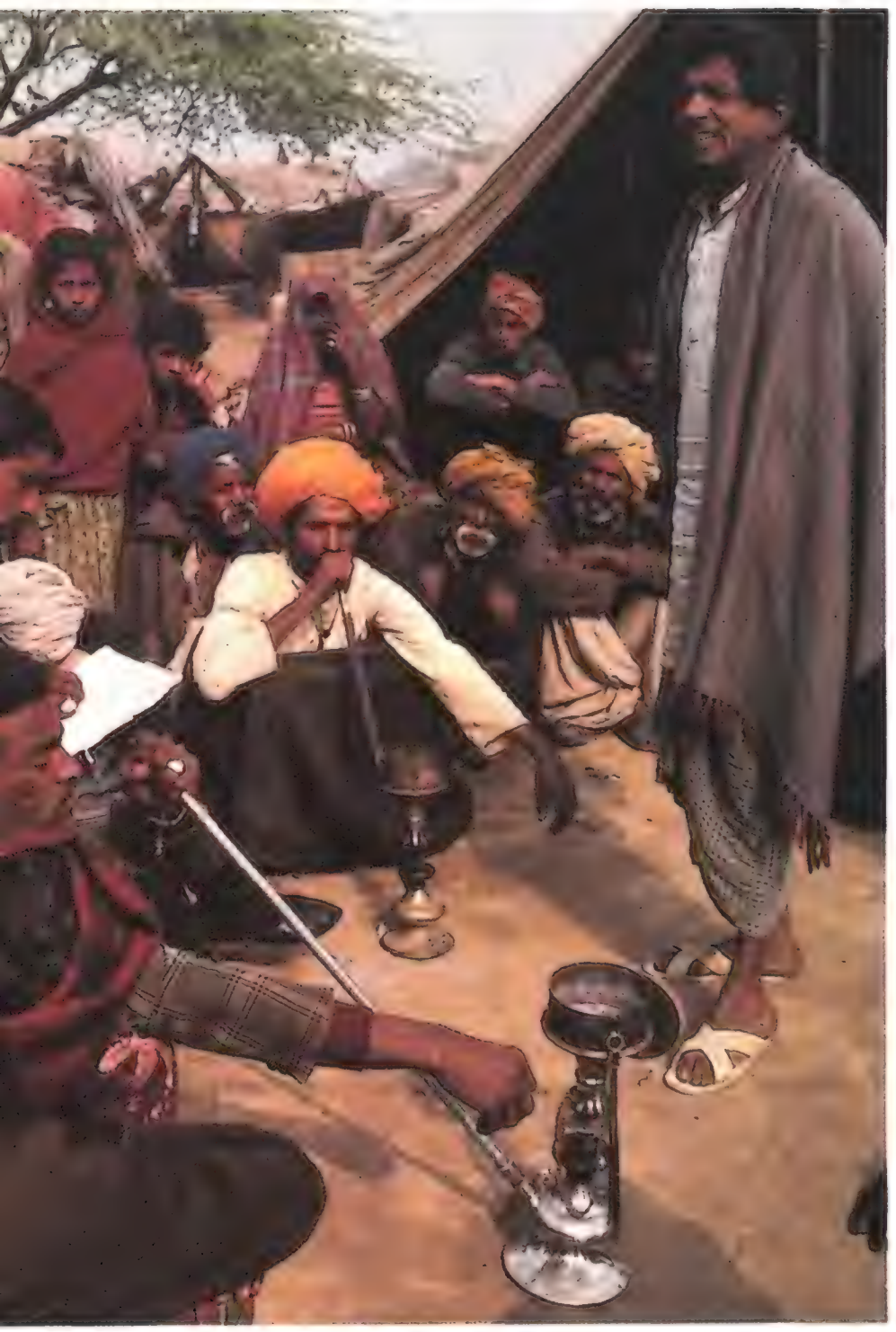
At this point, Bala remembers, he sat on the sodden ground and wept. "In days gone by, when I was still a child and wandered from village to village with my father, a *raja* or a rich landowner or a village headman would present us with a camel or a horse or goats, in addition to a year's supply of grain, temporary shelter, money, clothes and gifts." But by the time Bala grew up, things had changed in the countryside for all of the itinerant performers, whether they were jugglers or snake charmers, magicians or bear trainers.

Declining support for the wandering artists

Actually, support for them had begun to fall away as early as the 16th century when, under the Mogul rulers, attention centered on court dancers, singers and poets. Later, industrialization broke down the old village society and feudal system. More recently, since India's independence in 1947, television and movies have dealt severe blows to the traditional artists.

Few people in rural areas can read or write, so they cannot turn to books and magazines for knowledge or relaxation. In the past, when communication was difficult and bandit gangs roamed the countryside, folk artists were among the few links between small villages and the outside world. They brought not only entertainment but news, contributing in many ways to the integration of the country. But gradually, even in

Acrobat Hira Bai, who will be on the Mall this month, fries an egg on her head while maintaining balance.



Members of artists' cooperative at Shadipur gather over hubble-bubbles for an impromptu policy meeting.

rural areas, as people began relying on TV and movies for information, the performing arts ceased to be a shared experience. The folk artists became the sole guardians of an oral heritage that extended back through countless generations.

Although villagers were still interested in their shows, the performers couldn't make enough to survive. So periodically they came to big cities where there was more money. "We were happy," says Bala, "until this first terrifying encounter with the authorities." That encounter 29 years ago was only the beginning; within six months they were chased away again. And yet again. The real culprit was neither the police nor the Municipal Corporation's slum-clearance drive. It was the archaic Bombay Prevention of Beggary Act of 1959, also applicable to Delhi. This act defines beggary as "soliciting or receiving alms in public places, under any pretence such as singing, dancing, fortune-telling, performing or offering any other article for sale." Also contributing to the artists' problem was the unwieldiness of the government bureaucracy in Delhi; the poor, low-caste artists would soon learn that official support from one agency didn't mean that others would stop harassing them.

Throughout the 1960s and '70s, the other performing communities were hounded in the same manner as the puppeteers. In ones and twos they all fled to Shadipur, which in those days was a stretch of wilderness forming an unfrequented fringe of West Delhi. One of the first to join the puppeteers there was Nasir Khan, a burly, mustachioed magician (p. 53). Bala Bhatt and his fellow puppeteers were suspicious when he came and settled close to their tents. Who knew what kind of black magic he would make? They had seen, with their own eyes, Nasir Khan's young son, Anardin, learning how to fly in the air. And the bear and the two monkeys slept with the family at night.

Sharing age-old professional secrets

Nasir Khan was also worried. He could charm multitudes, but could he succeed with puppeteers? The stalemate continued until one day Bala, unable to suppress his curiosity, offered to teach Nasir Khan a song in exchange for the secret of the flying trick. Soon, Bala was stroking Nasir Khan's monkeys, which enacted human roles. He learned that often animals are handed down from generation to generation—the monkeys' family tree could be traced to the era of Nasir Khan's great-great-great-grandfather. Bala, in turn, told Nasir Khan that several of his marionettes and their splendid gold-inlaid costumes were more than 50 years old. Befriending each other in this way, the two men laid the foundations of the new village. It no longer mattered whether the next settlers were

Family of monkey trainers huddles in a makeshift tent in Delhi. In recent decades, itinerant performers displaced from the countryside have moved into India's large cities, where they congregate in slums.

snake charmers, singers, dancers or craftsmen. In the past, they had lived and traveled separately, observing rigid caste barriers; but now, they gradually realized that they faced the problem of survival together.

For these performers, winning support would be a long process, but in 1976 they received considerable help from an Indian designer named Rajeev Sethi. Sethi, who had booked some of their acts for industrial shows in Delhi, recognized what a valuable cultural resource they were. "I sensed a kind of unity in the group," says Sethi today. "I asked them, why just stay with your own castes—why don't all of you form a cooperative?"

Some were hesitant; others were prepared to give it a try. After much discussion, 35 artists agreed to participate, each putting up a capital share of 50 rupees ($4). They called themselves the Bhule Bisre Kalakar Samiti—the Cooperative of Forgotten and Neglected Artists. But the Registrar for Cooperatives in Delhi, to whom they applied, found the concept preposterous, and refused to award them the status. Nevertheless, the performers felt new confidence. Influential organizations and individuals, including Pupul Jayakar, cultural adviser to Prime Minister Indira Gandhi, were taking up their cause. It would be only a matter of time, they believed, before their application was accepted. Several of them folded up their tents, which afforded scant shelter in storms, often sailing away into the sky with high-velocity winds. In their place, they put up more substantial huts of mud, cow dung and thatch.

But the huts were not destined to stand for long. Early one morning the following July, the Shadipur artists were rudely awakened by the rumble of bulldozers. In spite of their application for cooperative status, in spite of their new buildings, to their complete disbelief they had become the target of yet another slum-clearance drive. In less than two hours, the artists and their tents and belongings had been flung out onto the highway, bringing traffic to a standstill. Dazed, the homeless artists set up camp under the adjoining bridge.

A protest led by newspapers and cultural agencies

Veenu Sandal, a free-lance writer who lives in Dehra Dun, specializes in Indian social issues.

Impersonators at Shadipur make final adjustments to their monkey costumes; one will come to the Mall.

prompted the authorities to transfer them by truck to small plots of land in Sultanpuri, in a distant part of Delhi. But, says one performer, "people who sought our performances had got accustomed to looking for us at Shadipur. Nobody wanted to go all the way to Sultanpuri to find us." Steeling themselves, they trickled back to Shadipur, set up their tents and built anew their mud houses. This time, they declared, they can beat us—kill us—we're not going to move.

In the eight years since the artists reclaimed Shadipur after that last eviction, the tide seems to have finally turned in their favor. In 1978 the group was at last awarded official recognition as a cooperative. "We danced, feasted and rejoiced that day," says one of the artists. "Residents around thought everyone had gone mad." They had much to celebrate: each member was given a cooperative identity card to protect him from the police and poorhouse workers.

Immediately, the members began organizing their community. A *panchayat ghar* (village council hut) was set up to sort out disputes in the settlement. A workshop was built where performers could practice and artisans could work on carving and other skills. If the cooperative won a contract for a performer, ten percent of his payment would go into the group fund. Grants from the Ford Foundation, Oxfam and the Sharda Mahila Samiti have provided the group with business help and with a medical dispensary.

Still, their situation remains tenuous. The 16 acres of land the artists occupy at Shadipur, valued at more than eight million dollars, belongs to the Delhi Development Authority (DDA), a wing of the Works and Housing Ministry. Among its many functions, the DDA provides land and houses to the poor at heavily subsidized rates; in 1984, it rehabilitated 600 slum families. But a peculiar look flits over DDA officials' faces whenever the folk-artist question comes up.

"It was the most challenging—but is now the most vexing—problem I've faced in my career," says a town planner at DDA who has been involved with the issue. "We're wedded to social welfare, so let's say we even allot the rupees for the land—despite pressure from commercial lobbies—to the artists. We would still require at least another 90 lakhs rupees [$750,000] for housing alone. We just don't have those kinds of resources; don't forget, we have to deal with dozens of other poor areas in and around Delhi."

Even though the final decision on the land has not been made, the cooperative, with help from Rajeev Sethi, has gone ahead with ambitious plans for housing. In 1979, Sethi sought out renowned Egyptian architect Hassan Fathy, author of *Architecture for the Poor*. They came up with a proposed layout, but the cooperative members balked; the plan didn't take into account individual ways of cooking in their courtyards, sleeping and socializing, they complained. "I realized then we had to involve them," says Sethi.

Working closely with the Shadipur artists

With funding help from the *Times of India* and the Vastu Shilpa Foundation, a team of young architects and sociologists worked closely with the people at Shadipur. The resulting plan calls for the families to build their own homes in styles reflecting their village traditions, while the overall neighborhood layout of paths and communal areas is derived from how the group actually interacts. For now, however, the plan for the model village, which they have named Anandgram, cannot be carried out.

In the meantime, behind a facade of pluck and bravado, the community is restless. "We are always worried that when we return after a day's work," says one performer, "there will be no settlement." But life goes on; skills must be perfected, marriages arranged, yearly visits to home villages undertaken. And, always, everyday problems need to be solved: in the evenings,

when they return after giving street shows and honoring contracts, their pockets filled with earnings, fierce discussions take place in the *panchayat ghar.*

There was, for example, Lacchmi Bai's complaint. For years, like most women in the settlement, she had been content to stay at home, stitching and embroidering fancy clothes for her husband's marionettes, cooking his meals in the open on a wood fire, fetching water and looking after the children. But, the men said, the formation of the cooperative had gone to her head. She now wanted to break away from the age-old tradition, in which only men manipulate the string puppets. Lacchmi Bai, an accomplished folk singer, wanted to form her own puppet group.

A compromise for Lacchmi Bai

"Don't women acrobats like Hira Bai perform dazzling feats in public?" she argued hotly. "If that is acceptable, then why can't I have my way?" Ultimately, there was a compromise: Lacchmi Bai could go out in search of contracts for her husband but, lacking the years of necessary training, she would not be allowed to manipulate the string puppets.

Not long afterward, the acrobat Hira Bai ran into a crisis, too. Life had been good to her: she could walk on a tightrope and whirl on her belly atop a ten-foot pole, while her husband drummed below. It was dangerous work without a safety net, but she loved it. Three or four times a day, Hira Bai thrilled crowds at a street corner or in a park, collecting 40 or 50 rupees (three or four dollars) for one show. But then, suddenly, her husband died, leaving her to care for and train two tiny tots, Sangita and Sunita.

Hira Bai considered returning to her village near Pune, a two-day journey from Delhi, but quickly rejected the idea. She was now a part of Shadipur—why should she leave? Sitting at home, she stitched patchwork quilt covers and was paid 25 rupees a day by the workshop. The cooperative marketed her products, yet she longed to perform once again in the streets. Every day she saw a procession of snake charmers, drummers and magicians walk past her hut, bound for their beats in the city. She had heard of the new contracts that were beginning to come through for the cooperative, which now had 350 members. Wouldn't it be fair to share business equally?

The cooperative suggested that Hira Bai ask a male relative to join her. She contacted Dev Chand, her 16-year-old nephew, who gave up performing on the streets of Bombay and came to Shadipur a year ago. Now, Hira Bai, Dev Chand and nine-year-old Sangita put on a spectacular act. Four times a day Dev Chand leaps through a 15-inch ring of knives, held five feet above the ground. He was hurt just once when,

Delhi dog trainer smokes in conventional Indian way while his charges jauntily sport unlit weed cigarettes.

Resting on a charpoy, elderly snake charmer acquaints member of youngest generation with necessary skills.

Puppeteer Sagar Bhatt, Bala's brother, entertains a child at Shadipur; he will perform at Smithsonian.

Mitthu Ram Bhat, who sings and dances with dummy horse to drum accompaniment, will be at NMNH.

unable to earn an adequate amount for the day, he opted to give a fifth show on the roadside even though tired. As he jumped, the knives ripped through his body and bystanders rushed him to the hospital.

Dev Chand's feats impressed Shish Ram (see cover). A mischievous gleam in his eyes, he half-jokingly asked his father, Ram Karan, a *bhopa* (balladeer), for permission to become an acrobat. "Be off with you," an exasperated Ram Karan exclaimed.

In accordance with age-old custom, 11-year-old Shish Ram is betrothed to a six-year-old girl in a remote village. When he was seven years old, his father and Gotli Devi, his mother, began teaching him the intricacies of storytelling, dancing, singing and playing the many-stringed *ravanhatta*. It will take Shish Ram another three years, his father says, to become a full-fledged *bhopa*, when he will play the *ravanhatta*, dance and sing the entire story of the 14th-century Rajput chief Pabuji, in front of a huge illustrated scroll. The ballad of Pabuji, traditionally performed at night, can take up to a week to relate. Once Shish Ram is capable of presenting the complete ballad, Ram Karan will formalize his wedding.

Like all the artist families, Shish Ram's parents retain their bonds with their native villages, visiting them at least once a year, generally during the monsoon. Ram Karan's ancestral village, Alsisar, is in Rajasthan. Before departing, Ram Karan, Gotli Devi, Shish Ram and his younger brother carefully pack their precious 15-foot-long scroll, wrapping it around a length of bamboo. They are equally careful with the 19-stringed *ravanhatta*. "It is more than 50 years old and was bequeathed to me by my father," says Ram Karan. "When I went to London for the Festival of India [in 1981], I was offered $200 for it, but I refused. I'll never part with it for the sake of an outsider. Someday it will be Shish Ram's."

Ecstatic village children welcome their bhopa

Ram Karan and his family are treated with great reverence in their village, where they own three mud houses. "Our *bhopa* has come back, our *bhopa* has come back!" cry ecstatic children. There are about 400 houses in Alsisar, but only ten performing artists—all balladeers. "We would like to stay in our old village for longer periods, but Shish Ram gets impatient. He misses the hustle and bustle of Shadipur. He's always in a hurry to go to Alsisar," laughs Ram Karan. "Once there, he's in a hurry to get back to Delhi."

The youthful Shish Ram loves Delhi, but its big-city temptations have not lured him away from the traditional life that his parents foresee for him. As with all the artists, the hopes of Ram Karan and Gotli Devi are pinned on their children. All feel deep sym-

pathy for Bakshi Bhatt, who is unanimously acknowledged as the finest puppet carver at Shadipur. He has six sons who, faced with an uncertain future, rebelled one by one against learning the ancestral arts.

Ajit, the oldest son, prefers to polish furniture, while Puppu is a bus driver. The three younger ones have become contractors while the youngest is an auto-rickshaw driver. "It's a living death for me to see my sons adopt alien professions. It means the end of a more than thousand-year-old tradition in my family. What else can I say? I am a broken man."

The frustration of parents like Bakshi Bhatt, whose children do not share the commitment of their ancestors, is the strongest reminder that the Cooperative of Forgotten and Neglected Artists is suspended between past and future. Pupul Jayakar, now chairman of the Indian Advisory Committee for the Festival of India, has pointed out that, because they have always been under a patronage system, the performers' adaptation to modern patrons may be easier. But will it be possible for them to sustain their folk arts without atrophy setting in?

"The change of a wandering ethos," says Mrs. Jayakar, "could bring with it dilution of creativity, but the artists may assume new roles." Already, they have become ambassadors of culture, carrying rich, fascinating facets of India's ancient past to people all over the world. "Of course," she adds realistically, "the present position is one of great flux. We have to wait and see." Rajeev Sethi, who continues to champion the Anandgram plan, adds, "We must always remember that there are no utopias."

For the Bhule Bisre (Forgotten and Neglected) members at Shadipur, who stake their lives on their art, the immediate concern is how long it will take for Anandgram, the village of their dreams, to materialize. In spite of the many problems they face—land, housing, income and keeping their children involved—they are supremely confident about their arts and traditions. "We have nurtured them for centuries," one of the performers says. "They will never die, and we will never vanish, provided the authorities leave us in peace." Even now, a crowd watches in hushed wonder as Anardin goes up into the air, Nasir Khan's bear does a disco dance and Hira Bai effortlessly fries an egg on her head.

Magician Nasir Khan relaxes with his trained bear in front of his tent at Shadipur. As one of the earliest artists to join the puppeteers, he broke the ice by teaching them the secret of his son's flying trick.

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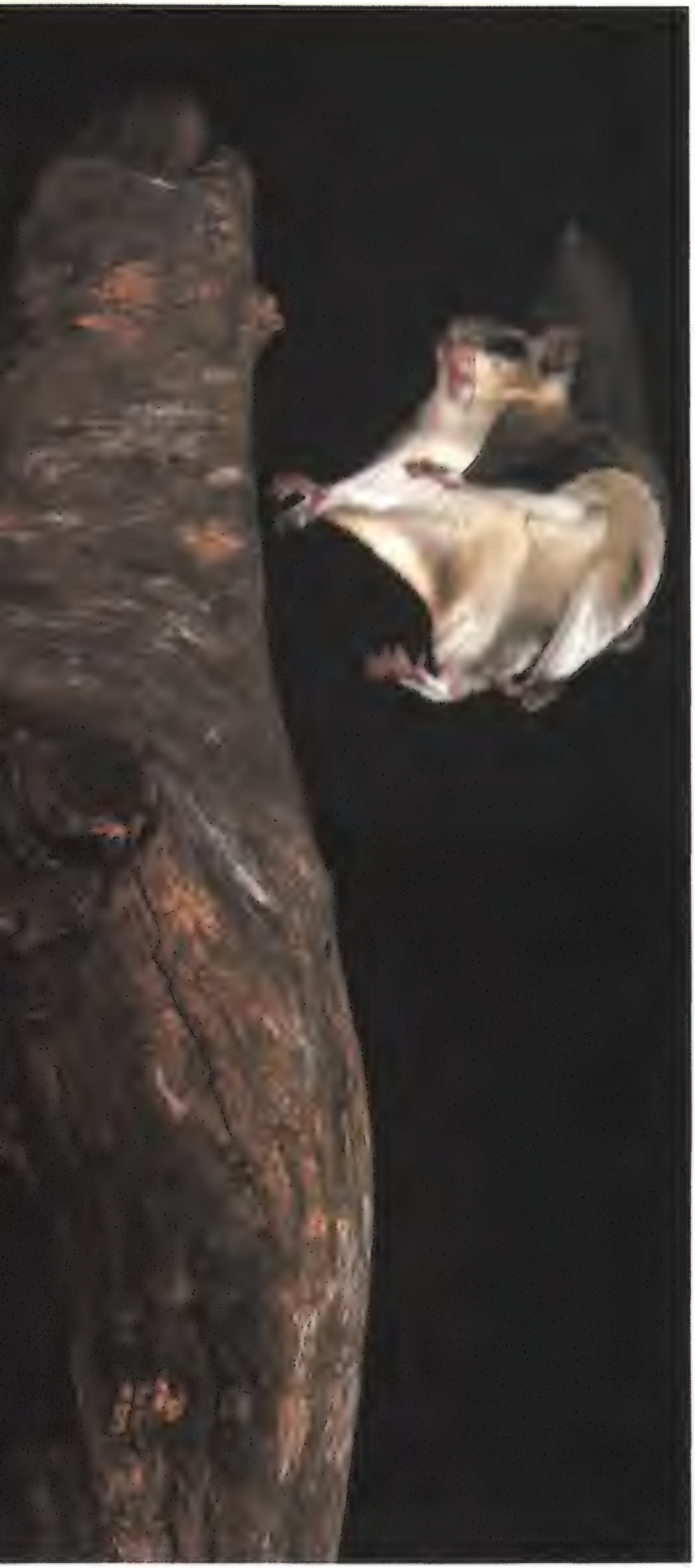

Head back, tail up, flying squirrel comes in for a landing with its patagium billowing like a parachute.

By Nancy Wells-Gosling

This little squirrel keeps a big trick hidden in its sleeve

On a chilly May morning in 1976, my husband stepped outside our home in southern Michigan to fill the bird feeder and returned almost immediately. Extending his arm toward me, David opened his gloved hand to reveal a tiny animal with large eyes, loose skin and a flattened tail. It was a young flying squirrel that apparently had tumbled to the ground, unhurt, while exploring near the entrance to its family's nest. I reached down to touch it and the squirrel instantly grasped my finger with its forepaws, setting its teeth against my skin. It did not bite but seemed to be warning me that it could defend itself if necessary.

It was a singularly handsome creature. The fur on its back was fine and softly textured, with a subtle intermixing of gray and gray-buff hairs. In striking contrast, the fur on its underside was a vivid cream-white. Its enormous dark eyes endowed it with an intelligent expression rarely possessed by rodents. Its large, nearly naked ears perked forward inquisitively and its long black whiskers shimmered around its muzzle.

A loose fold of skin extended from the wrist of the animal's forearm to the ankle of the hind leg along both sides of its body. At the outer edge, where top and bottom met, the fur was distinctly darker. This flap is called the patagium, a feature unique among North American mammals. When mature, the squirrel would be able to execute long, graceful glides through the forest by extending its front legs and stretching the patagium as an airfoil.

At about five weeks of age, our squirrel was still dependent upon its mother and could not have survived on its own in the wild. I mixed a milk formula and offered an eyedropperful; the sustenance was eagerly accepted. I was accustomed to caring for orphaned wildlife, but that foundling struck an especially responsive chord. Captivated, I made up my mind to learn everything that I possibly could about flying

The patagium, a loose fold of skin along each side of the flying squirrel's body, enables the furry acrobat to glide amazing distances

squirrels. Since then, I have spent hundreds of hours observing both wild and captive animals. Getting to know these fascinating creatures has been a thoroughly enjoyable and deeply rewarding experience.

Most people encounter flying squirrels only rarely, if ever. They easily escape notice, being the only nocturnal squirrels on this continent. In southern Michigan, their numerous diurnal relatives are much more familiar. These include fox squirrels, gray squirrels and red squirrels, as well as chipmunks, groundhogs (SMITHSONIAN, February 1985) and ground squirrels. But even though they are seldom seen, flying squirrels are often just as abundant as their sun-loving counterparts. In fact, they frequently nest in attics or roofs of houses, remaining undetected by the owners unless they become too noisy while chasing each other or rolling nuts about at night. Sometimes their presence becomes known when their high-pitched chirps and squeaks distress the sensitive ears of the family dog.

There are two flying-squirrel species in North America and their ranges overlap slightly. The northern species is found throughout Canada, Alaska and the Northern states. In mountains of the East and West, the species extends its range farther south but is restricted to the higher altitudes. The southern flying squirrel inhabits the forests of the Eastern states and southern Ontario, and a few isolated populations have also been found in Mexico and Central America. Fortunately for me, both species occur in Michigan, with their ranges meeting in the upper part of the state.

It's not easy to distinguish between the two species, but there are some fairly obvious differences. The northern flying squirrel, at ten to 15 inches in length and weighing four to eight ounces, is larger than the southern species, which is eight to ten inches long and weighs only two to four ounces. The northern species has a thicker pelage and thus tends to look more ro-

Wide-eyed rodent peers out at a visitor from its nest site, an old tree cavity excavated by a woodpecker.

Graceful glider extends its legs to stretch patagium for full airfoil effect. The tail is used as a stabilizer.

bust, the face profile in particular appearing more rounded. The tail accounts for 40 percent of the animal's total length in both species, but the northern flying squirrel's tail is thicker, more uniformly colored and often has a dark tip. Northern adults vary in color from light tan to rust brown, whereas southern adults tend more toward charcoal gray.

In Michigan, the flying squirrels' New Year begins around late February, when the winter thaws come. More snow will certainly fall again before winter relinquishes its grip, but for a while at least the ground may be almost bare. Sap begins to flow in some trees; at the far end of our woodlot, small wounds oozing sweet fluid appear in the bark of a large, imposing maple. Southern flying squirrels are once again actively foraging after long weeks of quietude; they eagerly seek the sweet sap by gnawing away bits of tree bark.

Dressed warmly against the evening cold, I place a handful of seeds and cracked nuts at the base of the maple and sit back to wait for dusk to fade. The level of light is the best indication of when the squirrels will arrive at my feeder. My rule of thumb is to glance occasionally at the maple tree six feet away. When I can no longer see details of the tree's bark, I know that a visitor will arrive soon. With luck, I see the movement of a squirrel about 60 feet away and can watch as it glides unerringly toward the tree where I sit. The small form slices through the air beneath the tree canopy, veering left or right to avoid trunks and branches. It might easily be mistaken for a floating leaf except that on such a calm evening no leaf could be driven so far through the woods. A few feet from the maple tree, the glider makes a sudden, sharp upward turn. Its white underside flashes in the dim light as its body swings into a vertical position, bringing all four feet to the front for landing (p. 56). In an instant it contacts the trunk, the only sound being that of tiny claws digging into bark.

Without even a fraction of a second's delay, the squirrel dashes up the tree trunk or slides around back out of sight. This evasive action probably helps foil any pursuing predator, such as an owl. When satisfied that it is not being chased, the squirrel comes around the trunk again to survey the night's ration.

Flying squirrels are nocturnal animals and so these two probably left their nest when they were disturbed.

Almost invariably, the first arrival is an adult female, the "boss" of the feeding station. Being accustomed to my presence, she glances at me only momentarily before running headfirst down the trunk to the base of the tree. Cracked hickory nuts are the choicest food items and are selected first. Climbing back up the tree with the fragment in her mouth, she settles on

This article is adapted from Flying Squirrels: Gliders in the Dark, *published this month by the Smithsonian Institution Press. The author is a doctoral candidate at the University of Michigan.*

a branch stub to eat. The squirrel balances on her hind feet with her back toward the trunk, and arches her tail over her body in a graceful, sigmoidal curve.

By this time another squirrel, either a mature male or subadult, glides in and warily climbs headfirst down the tree trunk. Should the first squirrel still be occupied with her food, the second arrival can snatch a portion of nut and move up the opposite side of the trunk. However, if the female has consumed her morsel and is ready for more, she chases the intruder away. Spiraling around the trunk, they scurry in the rapid, sidling motion typical of flying squirrels, chattering angrily. Finally, the harassed newcomer leaps to a tree several yards away and runs up out of harm's way, to return in a few minutes once the dominant squirrel is again preoccupied with a nut.

In flight, squirrel on right can change from straight glide by dropping arm for a turn, like one on left.

Two to four squirrels visit my feeder in February, the fewest number that the five acres of woods near our home will support all year. Their presence is not merely a reminder that winter is drawing to a close. It also heralds the renewal of life, for the southern flying-squirrel mating season is under way, ensuring the arrival of young by April.

After mating, the female makes preparations for her confinement by gathering whatever fibers are available. Meticulously, she lines her nest with bark and other material that she has reduced to fine shreds by holding it in her forepaws and tearing it with her incisors. As her time draws near, she retires within her nest, not to reappear for 24 hours or more after she has given birth. Litter size varies from one to six; the average is three. Southern flying squirrels may produce a second litter in July or August; northern flying squirrels produce only one litter per year in May or June.

For several days after giving birth the nursing mother hardly leaves the nest; even food is of little interest. She crouches over the young squirrels hour after hour, her patagium spread like a blanket to keep them warm. In the evening she prepares to leave the nest for a short time. Carefully, she envelops the nearly naked babies in soft material. Before slipping away, she watches and listens several minutes for danger. Once outside, the female stamps and slaps her hind feet vigorously to start the circulation flowing; after many hours in a confined position her muscles are cramped and stiff.

This accomplished, she devotes a few minutes to some much-needed grooming. She draws her forepaws together over her face, starting behind the ears and progressing to the nose, then repeating the process several times in rapid succession. The session ends with a quick combing of the tail. She grasps and draws it with a rubbing motion between her forefeet from its base to tip. Now she is ready to set off.

After a long winter, food is not always easy to find. Mild nights bring out a few fluttering moths which

As it reaches the end of its glide, the squirrel swoops up slightly and "stalls" itself into a gentle touchdown.

A week after birth, squirrels are naked; their eyes are shut, but the loose gliding skin is clearly evident.

the female pounces upon, or perhaps she finds other insects and spiders still confined to their winter retreats. A bountiful nut crop the previous autumn means good fortune; the highly nutritious nuts are still available in hidden caches. A dried piece of fungus, lichens, bark or green tree buds may contribute to her meal. If hunger is severe and food scarce, some females will not pass up an opportunity to kill and eat a roosting bird.

Although her time out is well deserved, the mother will not remain absent any longer than necessary. Having tended to her immediate needs, she returns to her family. In the morning, just before sunrise, she may slip out again for a few minutes.

The young are helpless but the mother can usually be counted upon to defend them. Boxing with her forefeet to discourage a weasel or some other would-be predator from entering, she sinks her teeth deeply if the intruder persists. Inside a secure tree cavity with only one small entrance, she can usually prevail. But should one of her young be pulled from the nest, the female may make a lunging grasp, using teeth and forefeet to retain possession of her offspring.

Nevertheless, the first week or so after birth can be an uncertain time for some pups. If a dangerous situation occurs during that time, the mother might abandon her family. This may seem cruel, but the point is that at least she remains alive and can produce another litter. Nothing can be gained if she loses her life.

Maternal steadfastness varies widely. It always seems to me that young females tend to be more fickle, experienced mothers more reliable; but this is not invariably true. Each individual is different. However, after a week to ten days have passed, any mother will usually take considerable risks to ensure the welfare of her babies, regardless of her earlier attitude. Her investment as a parent is, at that stage, quite large. Starting over again would require much energy and many risks, and by then the season is well advanced.

Many tales have been told about the attachment of mother flying squirrels to their young. Perhaps the earliest account of this "devotion" was written in 1849 by John James Audubon and his fellow naturalist, the Rev. John Bachman: "A piece of partially cleared wood having been set on fire, the labourers saw the Flying-Squirrel start from a hollow stump with a young one in her mouth, and watched the place where she deposited it, in another stump at a little distance. The mother returned to her nest, and took away another and another in succession, until all were removed; when the wood-cutters went to the [new] abode . . . and caught *her*, [she was] already *singed* by the fire, and her five young [were] unscathed."

Biologist J. W. Stack wrote in the 1925 *Journal of Mammalogy* about the "courage" shown by another flying squirrel mother. Some forestry students were trimming trees along a river in southern Michigan when one of them sawed off a limb containing a flying-squirrel nest with young. The mother escaped and the student carried the nest to the ground. As the group inspected the babies, the female glided from across the nearby river, landing at their feet. Scaling the pants leg of the student holding the nest, she grasped a baby, climbed back to the ground, scurried up a nearby tree and sailed back across the river to deposit her offspring in a new tree cavity. The performance was repeated three times. All of the babies were retrieved directly

At four weeks, the creature's eyes are open and it is covered with fur. However, it still depends on mother.

A female prepares to carry a fallen infant back up to the nest. Squirrels can even glide with such a load.

out of the student's hands as the others looked on.

A female will take great pains to move her babies to a new site whenever the nest becomes unsuitable for occupation—for instance, when the flea population becomes unbearable. She is familiar with all of the available secondary nests within her home range and will carry the young, one at a time, to a new home. She does this by first nosing the baby onto its back and then gently grasping it in her teeth across its stomach. Instinctively curling into a ball when lifted, the youngster appears wrapped around the lower half of its mother's neck, "like a huge goiter," as someone once described it. The female's movements are not hindered with the baby in this position. The maneuver does not always progress smoothly. When in a hurry, the female may grab any convenient part of the baby, usually a leg or the patagium, but sometimes an ear or tail. The baby curls up as usual, but dangles awkwardly beneath the female. She then must stop and position the infant properly if she has far to go.

A female will not hesitate to glide while carrying a baby. Although her first effort might fall short if she fails to compensate for the additional weight, subsequent glides are right on the mark. Her head is held well back when climbing a tree trunk to prevent rubbing the young squirrel harshly against the bark.

The infants' eyes open at four weeks of age. Growing stronger each day, they play and wrestle ever more rambunctiously. By the time weaning begins at six weeks, the curious youngsters have started to explore

Mother keeps an eye on a pair of six-week-old squirrels as they start to explore the world outside the nest.

outside the nest: climbing around on branches, nibbling on buds, fungi and insects, and attempting short jumps that gradually lengthen into glides. Soon they are fearlessly making jumps into unknown territory, sometimes with unforeseen consequences. Leaping for a tree with smooth bark, for example, they may fail to obtain a grip and tumble to the ground. Or, collisions with twigs may leave young squirrels hanging comically by one or two of their feet, reaching desperately for more secure footing.

On a familiar gliding route, an adult squirrel simply leaps out and spreads its patagium with no other preparation. However, an inexperienced young glider (or, for that matter, an adult about to embark on an unfamiliar route) displays more caution, looking before it leaps. Bobbing up and down in a rapid series of "push-ups" or leaning far left and right in rapid succession, it studies the prospective gliding path. If still not satisfied, it scurries sideways, crablike, for a better view from a different angle.

Hungry squirrel gobbles a meal of fungi, an important food source in the North, where nuts may be scarce.

Presumably, such gymnastics allow better judgment of relative position and distance through parallax. As in most rodents, the flying squirrel's eyes are placed far to the sides of the head, providing a wide field of vision, good for detecting predators coming from any direction. However, such eye placement also restricts the field of visual overlap to the front and therefore limits depth perception. The squirrel's small head, with only a short distance between the eyes, further accentuates the problem. So, to overcome these limitations, a squirrel triangulates, viewing its glide path from two or more angles.

After a navigational fix has been taken, the squirrel crouches low. Powerful hind legs launch the intrepid aeronaut. Once the animal is airborne, its patagium is spread to control speed and direction of descent. However, sometimes the animal allows itself to plummet several breathless yards with legs held close to the body before opening the patagium like a parachute to abruptly interrupt the fall. It then planes off on its glide path.

Dropping an arm signals a turn

No matter how often I witness flying squirrels in action, fascination and envy linger. Their beauty, grace and efficiency defy description. Even though they cannot maneuver in the manner of a free-flying bird or bat, they are adept pilots. Often a squirrel must swerve sharply. This is accomplished by dropping an arm, which creates an aerodynamic drag and spins the animal into a turn.

Many variations from the "normal" gliding procedure are displayed. Takeoffs occur from just about any position, and occasionally do so accidentally after a squirrel loses its footing. Sometimes the animal fails to notice an obstacle and gets knocked for a loop halfway through a glide; thin electrical and telephone wires are a particular hazard in this respect. However, the animal quickly recovers its composure and twists back into gliding position before hitting the ground. A glide can be a downward spiral instead of a horizontal movement. To drop straight down a squirrel pancakes with the patagium outspread, landing spread-eagled on all four feet.

Most glides span distances of 20 to 60 feet, but squirrels are capable of covering 150 feet or more and they have been known to sail the length of a football field down mountains and hillsides. Such feats are beyond the skills of most young squirrels, of course, but by the time they are 12 weeks old the juveniles are perfectly able to navigate through the forest canopy—and a good thing, too. In June, the southern flying-squirrel

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"I could go for something Gordon's"

The possibilities are endless

mother may be interested in mating again, which means that soon her offspring will have to find another place to live and start foraging for food on their own.

Like many other woodland foragers, flying squirrels are inclined to eat whatever is available at a given moment and consequently their diet varies from nuts and seeds to berries, insects and, sometimes, small birds. A family of squirrels can easily devour a quart of tasty June bugs at a single sitting. Grubs, larvae and even spiders and slugs also serve as fare. Since they dwell in a different ecosystem, northern flying squirrels do not have access to all of the same foods that nourish their southern cousins, but they take what they can get and also consume fungi and lichens.

Familiarity with every cavity and potential nesting site available within her home range is a must for the mother squirrel. As young squirrels become independent they, too, discover the locations of cavities, crevices and other potential shelter. Such explorations serve a useful purpose. When danger or inclement weather threatens, a haven can be reached within seconds no matter where the animal is foraging.

Some refuges are used exclusively for defecating. Other cavities, perhaps unsuitable as nesting sites for some reason, are used as feeding shelters where the animals can dine in comfort and safety. I have found such cavities so full of discarded acorns and hickory-nut shells that I wondered how the squirrels could

Sprucey, the author's pet squirrel, finds a comfortable place to set up housekeeping in the sleeve of a shirt.

even enter. The variety, characteristics and locations of nesting sites are endless, but such homes are in heavy demand by many different kinds of animals, including birds, mice, red squirrels and bees. Red squirrels and woodpeckers may, on occasion, rout flying squirrels out of their homes. At other times, compromises are struck. Audubon and Bachman told of an old purple-martin house that was found to contain about 20 flying squirrels, as many bats and at least six screech owls. What a party!

Squirrels routinely follow well-established routes between their various shelters, and when disturbed they almost invariably use the same escapeway to a nearby snag. Zoologist Illar Muul removed a snag that a group of squirrels had regularly used for escape, and found that the animals still tried to glide to it without noticing that it was no longer there. One squirrel made four attempts, from different angles, to land on the missing snag before finally taking refuge elsewhere.

Life is precarious for flying squirrels and, in most cases, short. Captive animals often live ten to 13 years, but by that age their teeth are worn out and their bones are distorted by arthritis. Mercifully, wild squirrels rarely live long enough to suffer such afflictions. Only an occasional squirrel survives more than four or five years; most end their brief lives as someone's dinner, or succumb to the elements. Typical predators include red-tailed hawks and owls; bobcats and lynxes; coyotes, wolves and foxes; skunks, weasels and martens; snakes and domestic cats. The great naturalist and writer Ernest Thompson Seton found a flying squirrel in the stomach of a trout, which must have taken the animal after it fell into a stream.

Open water tanks, cisterns and even maple-syrup sap buckets are hazards for flying squirrels, which can become trapped in them and drown. Barbed wire is a

A family of squirrels in Michigan eagerly samples the bountiful rations of the author's feeding station.

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problem, too. Even the animals' mode of locomotion has certain obvious risks; despite their excellent vision, the squirrels occasionally strike objects in midair. While preparing a dead squirrel as a museum specimen, Robert Wrigley of Winnipeg, Manitoba, discovered a curious encapsulated structure under the skin of the animal's chest. It proved to be a winter bud of a balsam poplar. Wrigley surmised that the squirrel had lodged the bud under its skin while gliding. The bud was saturated with resin, which may have served to prevent inflammation and promote healing.

As summer gradually turns to fall, the shorter length of day has a discernible effect on the southern flying squirrel; it brings out the hoarding instinct. Activity increases frantically along about October; food storing becomes almost a frenzy. Flying squirrels do not put all of their seeds and nuts in one cache; instead, they scatter-hoard, storing nuts in many different locations, the forest floor being the most common repository. To "bury" a nut, a squirrel excavates a small amount of dirt and presses the nut into the depression, twisting it from side to side as if screwing it into the ground. Then, using its front incisors, it pounds the nut into a final resting position. After a few passes of the forefeet to cover the nut with dirt and litter, the mound is solidly stamped into place.

When Illar Muul studied hoarding behavior in southern flying squirrels, he certainly chose a species with prodigious capacity. One pair of his caged animals carried off as many as 400 nuts in a few hours. Extrapolating from his observations, Muul estimated that under ideal weather conditions, a squirrel would be able to store as many as 15,000 nuts in a season. Whether such a huge number is ever stored in the wild depends on many factors. Most small woodlots probably do not produce enough nuts.

If autumn has been generous, flying squirrels are well prepared for winter. They are sleek and healthy, not fat but with ample flesh. A generous food cache and a secure den crammed with bedding should sustain them through the coldest months. And to maximize warmth while minimizing energy loss, the animals crowd together in groups containing as few as four to as many as 20. Flying squirrels do not hibernate but they do remain relatively inactive. Forays out of the nests are kept to a minimum. If weather is harsh or food scarce, the squirrels become torpid.

The only respite from the monotony of winter comes with the onset of the mating season. Almost overnight the peace and quiet of the nests gives way to much restless fussing and scolding. The males start traveling far and wide seeking females and, with that, the flying squirrel's year comes full circle.

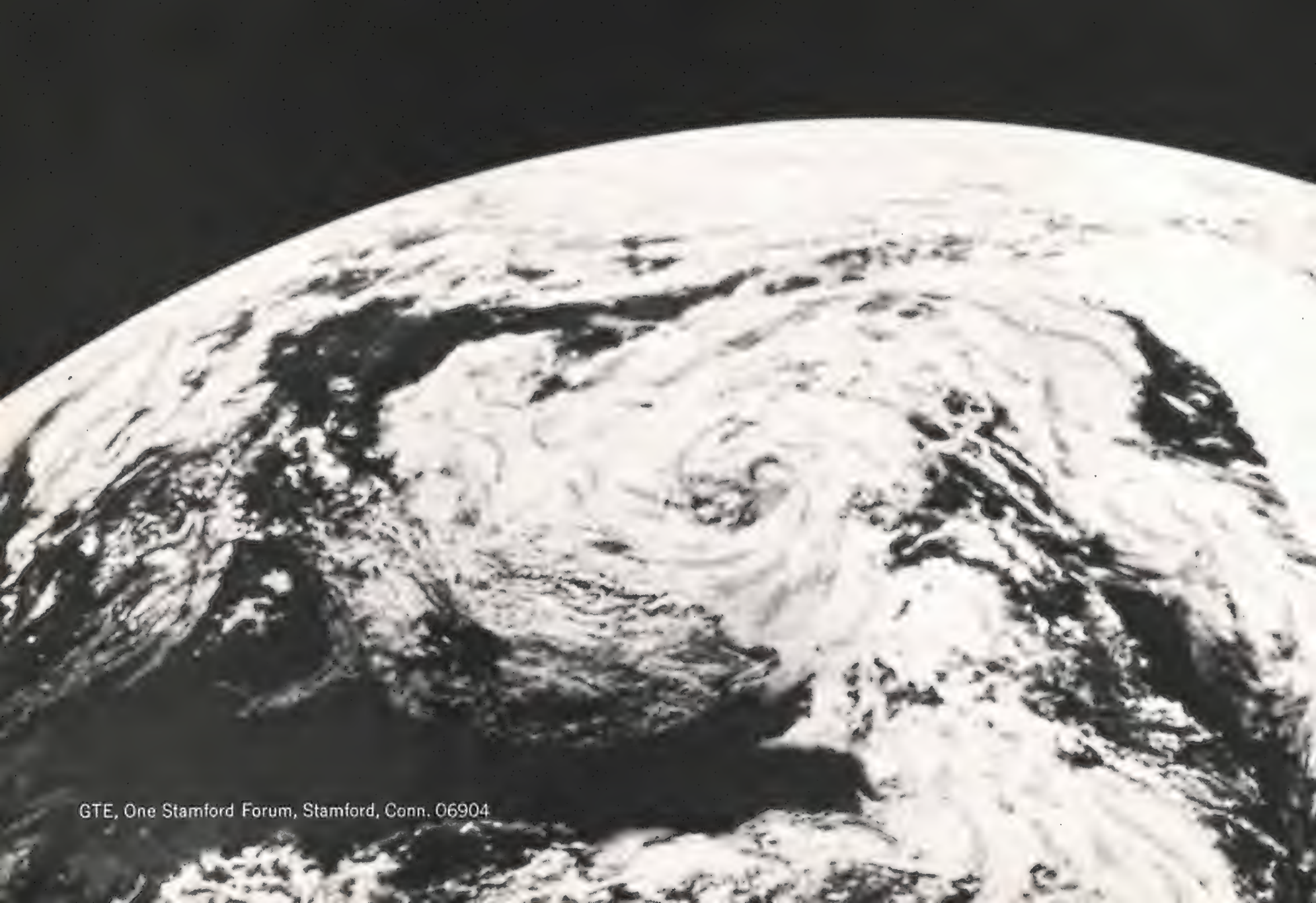
The best way to learn about flying squirrels, of course, is to go out and enter their twilight world. They are quite willing to share it, as many a woodland camper has discovered. The creatures have been known to pilfer food, slide down tent sides and explore occupied sleeping bags. Another way to study the creatures is to keep them as pets, although this is not a recommendation. They can be amusing and instructive companions, but they can also be messy (they do not house-train) and, at times, feisty (which includes biting). Flying squirrels are protected in some states, and a permit is required before they can be obtained.

Some people who own young flying squirrels worry that their pets will not learn to glide, and so they give them "lessons." These may consist of gently tossing an animal toward a suitable landing site—a hanging blanket or a nearby stump. Actually, lessons are not necessary but some animals seem to enjoy them, learning to glide back to the thrower like a boomerang. One naturalist recalls two childhood friends who played games of "catch" using a squirrel as their "ball." The animal squeaked and twittered whenever the boys walked past its cage, clamoring to be tossed.

One of the main conclusions I have drawn as a result of my study of these animals is that each flying squirrel is an individual, slightly different from every other in its behavior. It is this individuality and unpredictability that makes these creatures so utterly intriguing. Each day, I find, is likely to bring some new bit of knowledge or understanding and, at the same time, to open doors to still other questions.

So now you will have to excuse me. It is dusk. The flying squirrels are stirring again. I must go out and resume my squirrel watching—a lifetime of it.

Ready to glide off in an instant, two alert flying squirrels show they can be nimble on their feet, too.



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By Jack Fincher

Notice: Sunlight may be necessary for your health

Light has an enormous range of biological effects. The excitement is in learning to use them to cure depression and disease

One day in September 1974, Ann Smith (not her real name) was sitting in a car in front of her Midwest home when suddenly she felt as if "someone had just let all the air out of me. I couldn't move. It took too much energy."

Until that day, she had been a very high-energy person. At 26 she was director of social service at a hospital, a department she had started, and was working on a master's degree. But the next eight years became an agonizing roundelay of tranquilizers and mood elevators, of psychotherapy and electroconvulsive shock, as doctors sought an answer to the crushing depression that fell upon her slim shoulders every winter—only to lift, as mysteriously as it had come, each spring. While in its grip, life was "pure hell. I'd lie on the floor of my office and sleep because I couldn't handle anything more." One by one, as her diagnosis changed from anxiety neurosis to manic-depressive illness, the once bubbly woman left her job, then lost her career and husband.

Two years ago, Ann, who had moved back to her parents' home in Oregon, saw a newspaper story about Alfred Lewy, director of the new Sleep and Mood Disorders Laboratory at Oregon Health Sciences University. Lewy was continuing a study that he and his

For some people, moving from depression to high spirits is simply a matter of reaching for the sun.

Photographs by Peter Angelo Simon

Some investigators prescribe doses of very bright full-spectrum light for seasonally depressed patients.

former colleagues at the National Institute of Mental Health—Norman Rosenthal, David Sack and Thomas Wehr—had started on what they called Seasonal Affective Disorder (SAD), a baffling depression whose cyclic onset appeared to be curiously governed by the changing length of the day.

Ann and her therapist agreed that she had nothing left to lose; the antidepressant lithium carbonate enabled her to hold down an undemanding office job but precious little else. When they met, Lewy's first suggestion was simple: Why didn't Ann try getting up early, going out and greeting the rising sun with a walk? Ann steeled herself ("When you're clinically depressed you don't want to get up at *all*") and did. With astonishing results.

"On the fourth day it was as if someone took my body with both hands and shook it," she remembers. Energy flooded back; her perception of light intensified. Anything with strong pigment to it, like the green street signs, she could barely tolerate. "When I opened my eyes the fifth morning," she says, "I had 'popped up' "—her words for the dramatic shift from deep depression to fleeting mania that precedes her customary spontaneous upswing, usually weeks later.

When autumn arrived, Lewy's colleague, Robert Sack, gave Ann her own private "sun," a box of eight full-spectrum fluorescent tubes. She was encouraged to experiment in expanding her own day by setting the timer to turn on and off at varying intervals before dawn and after dark, until her fine-tuning hit upon some combination that kept her depression at bay.

Ann quickly found that 30 minutes at 5 A.M. gave her the greatest benefit—until the following fall, when she attempted to reset her own internal clock to square with the end of Pacific daylight time and moved her light exposure to 4 A.M. "It made me so high I was sick. Everything was speeding. Life was like a phonograph record changed from 33 to 78. It was like cartoons and colors were flitting in front of my eyes."

Once she moved the timer back to 5 A.M. to compensate: "There was a crash, like jumping off a building. Crunch! Right to the bottom." After readjusting the light for five minutes at a time over a few days, the bad effects of too much or too little passed. Today, Ann Smith's light box goes on in winter at precisely 4:40 A.M. for 30 minutes. As long as she keeps to her schedule, the winter of her discontent does not return.

Lewy and his associates would be the first to empha-

Jack Fincher, a frequent contributor, wrote about the Modoc War in February 1985. He lives in Oregon and sees less sunshine than he would like.

There is even evidence that spending a day outside may help overcome the discombobulation of jet lag.

size that Ann Smith's experience is at best "anecdotal evidence." But groups of SAD subjects being systematically watched in more controlled observations lead Lewy to the same provocative, if preliminary, conclusion: sunlight or its surrogate can affect certain people's rhythms and moods profoundly. How? Perhaps, they now theorize, light striking the retina stimulates a biological clock called the suprachiasmatic nucleus, an area of the brain known to mediate the pineal gland's secretion of the hormone melatonin.

This hormone—which is secreted only in the dark—regulates seasonal reproductive cycles in animals such as hamsters, sheep and deer.

Says Lewy: "Our finding that bright light suppresses melatonin secretion—even if ordinary room light does not—was what started us thinking about seasonal rhythms in humans and how they might be manipulated."

Indeed, through biochemical mechanisms we are just beginning to understand, light may contribute vastly more to our well-being than just making vision possible. Its beneficent results could include not only a tonic effect on the brain but on the body's immune system, as well as powerful new preventives or treatments for ailments as varied as tooth decay, alcoholism, black-lung disease and hyperkinesia.

Like everything else, light can hurt, too

At the same time, researchers are finding out more about the damage that too much light can cause. Students of photomedicine often divide human responses into two categories. True photoallergies, in which the skin reacts to light with an immune response, are uncommon. They may show up as hives or as itching, scaling or even weeping sores. Light-induced skin damage that is not produced by an allergic response is known as phototoxicity: sunburn is the best example.

According to dermatologists John Epstein and John Parrish, the skin responds to the immediate changes and damages within the cells. Ultraviolet radiation will inhibit the synthesis of proteins and the genetic molecules DNA and RNA, thus slowing cell division; it will shrink and break up other organelles (specialized parts of the cell). The skin reddens, tans and thickens as a protection. Repeated exposure over years can alter the skin: deep wrinkling, atrophy, uneven pigmentation, dilated blood vessels, yellow raised areas and horny growths. More serious is skin cancer, a normally treatable disease that accounts for about one-third of all cancers in the United States.

The rays of the sun filtering through Earth's thin envelope of protective atmosphere not only create and sustain all life, they do so in a relatively delicate balance that can go awry if disrupted. If too much sun can cause problems, so can too little. A child brought up in a shadowy tenement on a poor diet may have soft, deformed bones (rickets) because of failure to synthesize vitamin D properly. The chemical compounds that will eventually become vitamin D need the ultraviolet rays of sunlight to power their conversion. Our understanding of such light-driven reactions could be the key to a host of new curative and therapeutic techniques.

The role of light in medicine is not a new idea: Niels R. Finsen won the Nobel Prize in 1903 for his work in using light to cure a form of skin tuberculosis. But it received a whole new impetus in the late 1950s with a new treatment for jaundice in newborns. Until

then, when blood incompatibilities between mother and child sometimes led to a buildup in the baby of waste serum called bilirubin, which its immature liver often could not remove fast enough to prevent brain damage and death, transfusion was the only answer. Then a sharp-eyed nurse in England noticed that when such babies were wheeled near the nursery windows and left in sunlight, their jaundice color faded. Subsequent research indicated that the light bathing their all-but-transparent skin did something that rendered the deadly substance excretable.

The nature of that transformation has only recently been discovered. Contrary to earlier explanations, light does not break down the bilirubin or stimulate the production of the laggard liver enzyme that catalyzes excretion. Instead, a photon of visible blue light hitting a molecule of bilirubin merely—merely!—changes its physical configuration in a way that makes it water soluble and thus easily excretable.

Chemical reactions involving light are common and have been known for centuries. Milk and beer develop unappetizing flavors if left exposed in clear glass bottles. They contain riboflavin (vitamin B2), which itself is unstable in light and whose breakdown triggers release of odorous sulfur. Potato and corn chips in brightly lighted supermarkets turn rank from photooxidation of their cooking oils. Some pesticides become toxic only when they are exposed to sunlight.

Light-sensitive chemicals can also affect human beings, for better or for worse. Compounds in some soaps and cosmetics, for example, can cause allergic responses in light-sensitive people when they go out into the sunlight. But other light-sensitive chemicals can be used to our advantage. Soon after the sunlight-bilirubin connection was discovered, dermatologists found that certain light frequencies, used in conjunction with both ointments and internal medicines, could ease the ugly skin condition known as psoriasis.

Some researchers began looking into the whole question of connections between light and health. One of the most famous investigators was John Ott, a banker who became an artist at time-lapse photography. His films of plants growing and flowers opening were so good they were used in a number of the Disney nature films. Ott became fascinated with the reactions of plants to photographic lamps, and went on to investigate the effects of light and the rest of the electromagnetic spectrum on a great variety of flora and fauna. Shooting through a microscope, Ott could capture on 16 mm film the flow of pigment granules in animal cells and chloroplasts in plant cells. He found that they flowed in different patterns and directions, en masse or in small groups, or even stopped altogether when they were exposed to different wavelengths and intensities of light. Something analogous must occur within human cells, he contended, when the light around them changes.

Ott went looking for examples of humans whose health and well-being appeared directly affected by light, and he believed he found them. In one, a laboratory where contact lenses were made, the employees were remarkably free of flu. The lab had plastic windows, which admitted ultraviolet light. This is screened out by ordinary glass. (That is why you cannot get a suntan inside.) Another was a seafood restaurant in a hotel. The restaurant had black-light (ultraviolet) decor. The health record of the restaurant employees was so outstanding that management could not believe it, especially when they compared that record with those of other employees who worked in different departments of the hotel.

Circled areas on forearm are exposed to varying doses of laser light conducted through optical fiber.

Ott concluded that by deliberately screening out supposedly harmful trace amounts of atmospheric ultraviolet with tinted windows, sunglasses, suntan lotions and the like, we may be making ourselves more vulnerable to *malillumination* than we ever were to malnutrition caused by lack of trace amounts of minerals in our diets.

Says Stanford radiobiologist Kendric Smith, founding president of the 1,400-member American Society for Photobiology: "We know more about the photobiology of almost every organism than we do about the photobiology of humans. I've known John Ott for a long time. I've read his books and I have a great deal of respect for him as an amateur scientist. I think John has come upon a bunch of interesting anecdotal observations that should be pursued. There are at least a half dozen of his experiments I wish somebody would repeat with proper research controls."

Ott's early work was controversial enough, but he went further. He next suggested that in the absence of sunlight, the cumulative effects of man-made radiation (everything from TV sets and microwave ovens to radio transmitters and fluorescent lights) could produce a dramatic muscle weakness. Ott specifically worried about headaches and eyestrain reported by operators of video display terminals. But studies by the National Academy of Sciences and the Food and Drug Administration found working conditions, not excessive electromagnetic radiation, to be the culprit.

Ott contended that the whole spectrum of normal sunlight, including the ultraviolet mentioned earlier, is necessary for health. He also argued that certain wavelengths of light could have specific effects on humans. One of his best-known ideas is the "pink card," a card painted a "sundown" or "quitting time" shade of that color which he believed would cause a loss of strength. Other investigators took the idea a step further, reasoning that a pink room would have a calming influence on aggressive persons and violent prisoners. Several prisons have experimented with such rooms, but so far the evidence is inconclusive. In one case the whole idea backfired. Two men inadvertently left in a pink room for several hours attempted suicide after clawing great swatches of paint from the walls with their fingernails. Ott attributed the reaction to "psychophysiological overload."

Ott had succeeded, however, in shaking up the burgeoning field of photobiology, an omnibus discipline with more divisions than the Chinese army—all bursting to shed new light on just about everything from the chemistry of firefly luminescence to the discombobulatingly out-of-joint circadian rhythms of jet lag.

Today, investigators from Santa Cruz to Harvard, from MIT to Czechoslovakia, are plumbing light's mysteries with cautious optimism. On most of the work, much of the scientific community remains unpersuaded. Says Alfred Lewy, "I'm always troubled by researchers who claim biological effects when they don't measure biological variables."

Lewy nonetheless adds, "Still, this has got to be one of the more exciting areas in science. Now that we know that bright light does suppress melatonin secretion in humans as it does in lower animals, the important question is *how else* can bright light affect us? We're on the brink of a great unknown."

Harvard's John Parrish agrees. An investigative dermatologist, he directs the photomedicine unit within Massachusetts General Hospital's Wellman

Laser light at blue wavelength is used to break up a gallstone. Technique can be used internally.

Scientist tests for light-absorbing dyes bound to antibodies, which used with lasers may treat tumors.

Harvard scientist irradiates antigen-presenting cells with ultraviolet light, looks for changes in function.

Laboratories, a constellation of five facilities exploring such rarefied aspects of basic human interaction with light as the optical properties of tissue, the immune response to ultraviolet, the effects of laser light on a single cell, the photobiochemistry of organic molecules, and the impact of long-wave ultraviolet on circulating substances such as hormones and enzymes.

Everywhere Parrish and his staff look, they find surprises as intriguing—and potentially valuable—as the ongoing saga of infant bilirubin. For one thing, as much as ten percent of natural light in longer wavelengths penetrates the skull and reaches the brain directly. For another, two to three times the volume of blood in our bodies courses through the highly perfused layers of the skin and is irradiated in the time it takes to get a mild sunburn. And ultraviolet radiation, when applied locally to the skin, not only affects the immune system beneath it but works deeper as well, even in the spleen.

"We're not sure what to do with all this," says Parrish, "but there's all kinds of speculation. For instance, through what we call a therapeutic window, you might alter medicines as they circulate in the blood. Longer wavelengths are not very well absorbed, so they don't inflame tissues or change cell chemistry. But they go in very deeply, as you know if you put a flashlight to your cheek and shine it. So this may offer us the option of putting light in to interact with drugs at a deep level.

"Doctor Wurtman's group," he continues, referring to Richard Wurtman, director of the MIT Neuroendocrine Laboratory, "believes that because the release of certain hormones may be affected by the light-dark cycle, light could influence the way drugs are metabolized and affect their potency as well.

"Of the complex cascade of literally thousands of photoreactions that occur, you might be able to maximize the ones you want to happen and minimize the ones you don't. Using fiber-optic bundles we can now put light just about anywhere: the bladder, the GI tract, the heart. With very short-pulse lasers we can also target something as small as an organelle. Whole classes of metabolic disorders might benefit from altering a certain function within a specific cell."

Not only does visible light affect the behavior of enzymes, Parrish goes on, but in a recent study at Massachusetts General, long-wave ultraviolet was shown to increase the pulsatile release of endorphin (the body's own narcotic *cum* tranquilizer *cum* mood elevator) in the normal human being. From plant photobiologists, Parrish and others in his field are learning more about the light signals, such as changes in the duration of daylight, that plants use as cues to initiate flowering or seed germination. What is new is transferring the ideas to people. "It's not unreasonable that these same influences are possible in human tissue, and we just haven't discovered them yet."

And what about Ott's idea of malillumination?

"I haven't seen any double-blind, controlled scientific experiments to convince me that it's true," Parrish replies. "But the effect of ultraviolet on endorphin levels makes me think maybe it's possible that a little bit of ultraviolet may alter something in the endocrine system.

"The area of our ignorance is so large it's hard for any of us to make sweeping statements," he continues. "Sunlight is very appealing. The first day of spring in Boston, people take off their clothes and go lie down on the banks of the Charles River. We don't understand that response, but it makes you cautious about saying the ultraviolet argument is not valid."

And that complex cascade of *other* photochemical events he and his colleagues don't know about? Does he ever wake up in the night wondering about it? Parrish laughs. "Oh, yeah! That's the point."

Ann Smith would heartily approve.

A subject's entire body is bathed in ultraviolet light as part of treatment for a skin condition.

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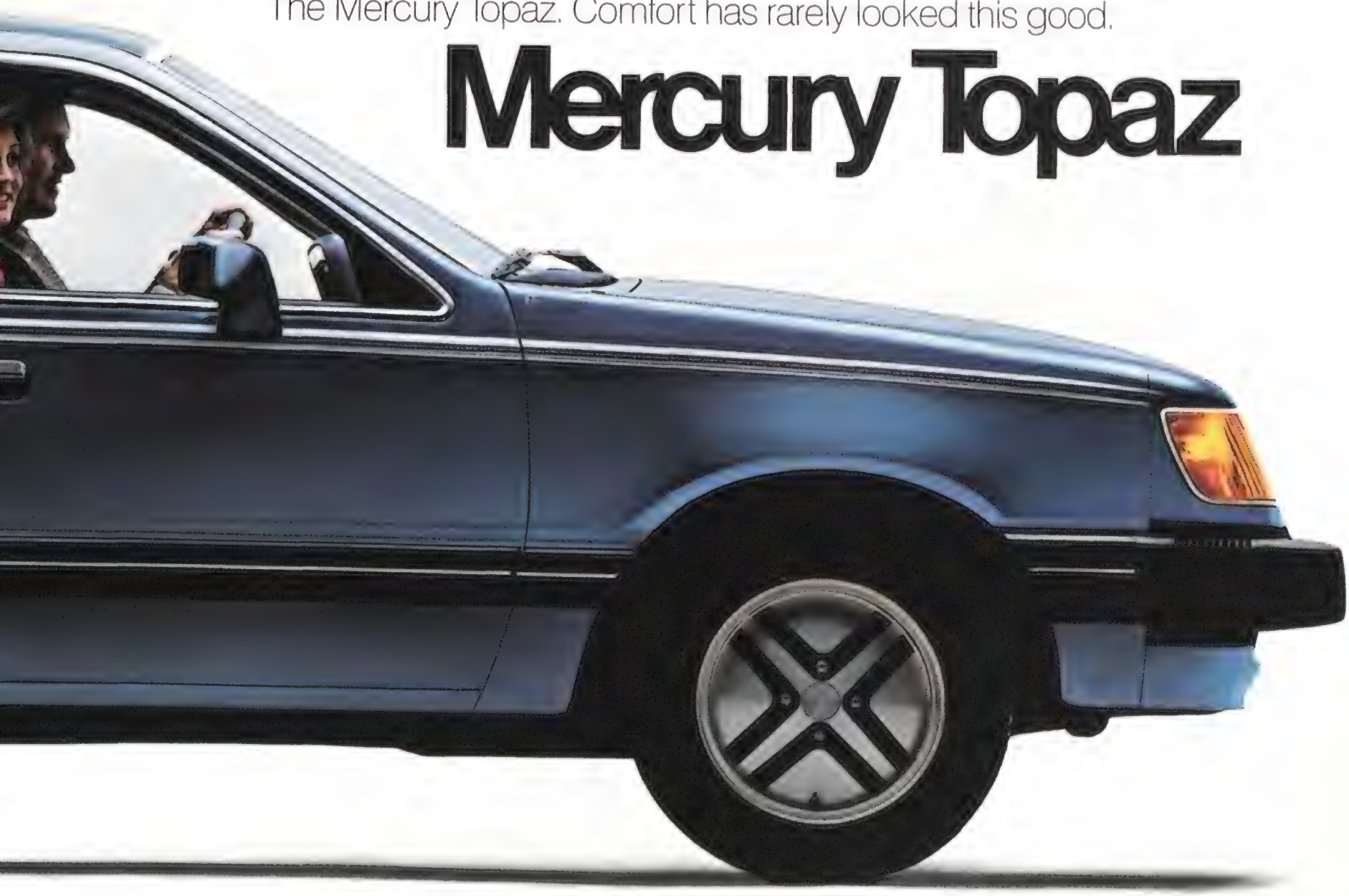


Get it together—buckle up.

By John Skow

Human flies can make mountains out of molehills

On rocks or stone facades, 'boulderers' and 'builderers' try daring, implausible ascents—just a few feet off the ground

On a residential street in a hilly part of Berkeley, California, there is a house lot with a house-size jumble of boulders on it. This enormous rock mass is still there, a visitor imagines, simply because in the '20s and '30s when the big, comfortable houses in the neighborhood were built, it was far too large to be dozed away by the developer's machines. Smooth, round, mortar-size depressions here and there in the stone are thought to have been used by Indians for grinding grain, and so this natural outcrop is called Indian Rock. Archaeologists of the future may guess, correctly, after careful examination of artifacts in the surrounding bushes, that local teenagers of our own time used the caves and overhangs here for drinking beer in the evenings, out of sight of their parents and the cops. The name of the place may then change to Party Rock, or Broken Bottle Rock, or some such, but for now it is the departed native Americans who are honored.

What may puzzle future researchers is an occasional faint, white handprint ten or 15 feet up, say, on a protected bit of vertical stone. What enigmatic primitives put them there? Was there a prophetic or religious significance? Can some parallel with the red ochre handprints left on cave walls by Paleolithic man be inferred? Or, given another sort of future, the research-

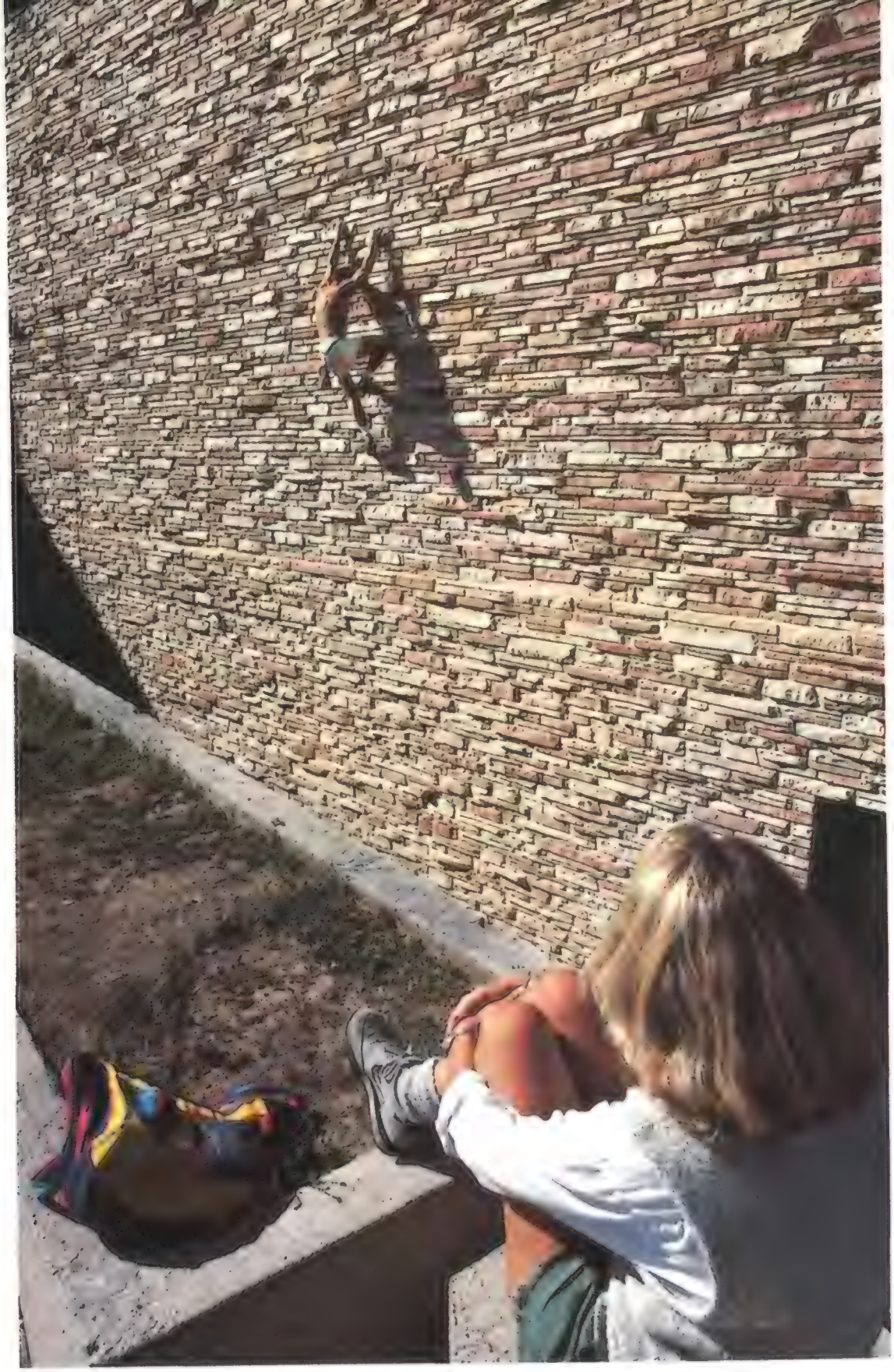
Bouldering in Colorado, a climber stretches for a fingertip hold that *may* just bear his weight.

Buildering up the front of college library, climber makes use of a technique known as "chimneying."

Photographs by William Thompson

Playing human fly, Paul Sibley works his way up the 35-foot-high wall of the University of Colorado Memorial Center.

On a freeway support in Oakland (right), Scott Frye pushes with feet, pulls with hands; this is called "laybacking the crack."



Doing a heel hook over an overhang, Zach Hausken reaches top of a Seattle tower designed just for buildering.

Working a triple crack below Oakland freeway, builderer uses finger and toe jams, but is belayed from top for safety.

ers may know exactly what they are seeing: "Hey, look, he did a finger jam here, and then, I dunno, yeah, smeared his foot there. . . . Wow, 5.12 at least! Where's my chalk bag?"

Solidly anchored in the present, I reflect on these possibilities as I wander about the base of Indian Rock, surveying it from different angles. I am waiting to keep an appointment, but the only human being in sight is a slender young man who has climbed ten or 12 feet up a vertical and almost featureless rock wall and there, as it appears, has fallen asleep. Or, no, he isn't asleep; I get the bizarre impression that as he hangs there with his eyes shut and his arms stretched above his head, his fingers extended and slightly flexed, he has nodded off in some sort of meditative trance. At any rate, there are white hand splotches everywhere on the rock, tracing eerie vertical paths up its sheer sides. They are magnesium carbonate, climbers' chalk, used to dry fingers that are sweating from heat, or exertion, or chickenheartedness. The extravagantly relaxed fellow on the rock does not seem to be suffering from any of these stimuli, but I can see that his hands are dusty with white powder.

A rock climber about to try a difficult pitch will, without thinking about it, take a pinch of chalk from the small, multicolored bag hanging from the middle rear belt loop of his climbing pants, the way a chess player will take a sip of coffee or a puff of a cigarette before making a difficult move. Rock climbing is like chess, in fact—though it requires strength and agility—and very little like such muscular sports as tennis and skiing. Even at modest levels of skill, the climber must think ahead: "There's a good foothold for the next step, and a marginal handhold above, but if I use my left foot, my right will be out there standing on air. So I start with my right foot, and now the handhold is mostly psychological. No, there's a flake, so maybe, um, a little chalk on the fingers, OK. . . ."

There are people who do this sort of thing hundreds of feet in the air, without the protection of belay ropes on rock faces that arc outward in great, hollow overhangs. They are playing chess with death. The kind of climbing that goes on at Indian Rock is simply play; chess problems, perhaps, rather than actual combat. What they do is called bouldering, and it can be easy or awesomely difficult, a sort of ascent in which adhesion is so tenuous that it seems less a matter of friction and fingers than of mystical belief.

I have moved around Indian Rock, and the climber I noticed, whose wall is no longer in my line of sight, now appears, walking at ground level, and introduces

John Skow, a free-lance writer, loves camping and climbing, lives in New Hampshire where he can cut his own wood and do his own skiing close by.

himself. He turns out to be the man I have come to see, a 29-year-old sports-shop employee named Fred Cook, who has been recommended as one of the best and most knowledgeable of the Indian Rock boulderers.

Cook is unusual among boulderers because he does not think of the sport as a way of practicing for big-wall climbing, but simply as a kind of solo ballet done on rock, worth whatever it is worth on its own terms. The ruling concept in bouldering, he says, is not hard to grasp: you don't climb anything you are afraid to fall from. Thus—so the rock-dancers here tell newcomers—you can afford to experiment with moves of supernatural delicacy, even though bouldering is almost always done without the protection of belay ropes. The purest sort of bouldering may be something like this: an absurdly difficult 50-foot traverse on a ledgeless overhang, no point of which is more than a few inches from the ground. If you have overmatched yourself, and you reach that ghastly point at which belief drains away and you know that in another moment the clumsy mass of your own body will peel you off the rock, you can mutter "Aw, nertz," step down to earth and begin again.

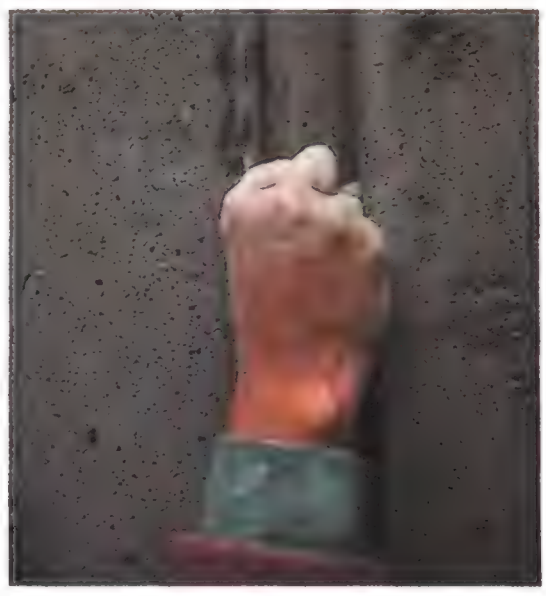
So goes the theory. Sometimes, of course, boulderers stretch this sensible concept to heights at which falling is a poor idea. As we talk, we are joined by two more boulderers who are friends of Cook—Dave May and Ann Horsburgh. May is on crutches. A couple of weeks ago, while climbing a vertical crack in the support for a highway overpass, he lost his hold about 12 feet up and broke his right foot on a curb as he hit the pavement. Dave is good-humored and he teases Ann by threatening to climb today, but his easiness has an edge. He wants to be on the rock. He is like any athlete forced to sit out a game with an injury; his reflexes are tuned too high for restful recuperation.

A discussion of the sociodynamics of bouldering springs up; Ann says that the rock can be a tense and uncomfortable place for beginners. People will show you the moves, yes, but you learn very soon that there is a pecking order. Among the women, too? Oh yes, she says; women climbers are very competitive. Girlish awkwardness is not prized here. Any good rock climber knows that, never mind what you hear about one-finger pullups, the legs are the basis of moving on rock. A very good woman boulderer—she mentions a tiny, almost weightless Japanese woman named Yuko who is legendary here—can do ascents that will confound all but the finest male climbers.

The others defer to Cook, who climbs fluidly and with no obvious display of strength, as if moving up a rock face that seems as smooth as a refrigerator door requires no more premeditation than strolling across a meadow. A fellow named Steve Moyles has appeared,

Handholds for crack climbing include this simple pinch grip.

In hand jam fingers lock knuckles against opposite side of a crack.



Wedged fist may lead to bloody hands, but can be a strong hold.

Watched by a neighbor, the Rev. Jean Shaw, of Westminster Presbyterian Church in Sacramento, makes practice run up 30-foot face of a celebrated bouldering site, Indian Rock, near Berkeley campus.

and has got himself into deep trouble about three feet up a route of considerable subtlety. "Fred, Fred, now what?" he yells to Cook, who answers, "That obvious knob there, then you just saunter up." But the knob isn't obvious and Steve peels off, laughing, turns in the air and lands on his feet and hands in the dirt at the base of the cliff.

Cook smiles when I tell him that he seemed to be meditating when I first saw him on the rock. "I do that sometimes," he says. He has not climbed here for a month or so. A year or so ago he bouldered for hours every day, he says, and he could do harder routes than he can manage now. Then, instinctively, in a natural act of balance, he cut back his commitment to the rock. "But look," he says, "here's one of the stunts I used to try." He takes a little brush out of his pocket and cleans city soot from a patch of Indian Rock. He moves onto the wall, face against the stone, legs wide in a splayed squat. Then he lunges and catches a double handful of rock on a face that seems to have no projections. Without pause he lunges upward a second time on momentum and arm power, digs his fingertips into a minute irregularity and holds. It is a baroque excess, useless in big-wall climbing, where one lunge is an act of desperation and two strung together would be lunacy squared.

All of this monkeying around is kid stuff, of course; aimless, whimsical goofing on rock, totally against the grain of American sport. There are no coaches chewing their neckties here, no recruiting violations, no NCAA finals, no agents negotiating contracts. There is no special clothing, and no closetful of high-tech gear to fondle. You can spend about $85 for the chalk and a pair of sticky E.B. or Fire climbing sneakers, but that's it. There are no lessons to take; climbing schools set up bouldering situations to teach big-wall techniques in safety, but not even the most earnest soul would pay to learn bouldering. It would be like paying to learn how to throw rocks at tin cans.

Did someone mention kid stuff? We have moved our circus to Golden Gate Crack, some miles from Indian Rock. This is the bridge abutment fissure on Golden Gate Avenue from which Dave May peeled a couple of weeks ago and broke his foot. Climbing here is a matter of "Because it is *where*?" with the end of the question pronounced in a tone of rising incredulity. Motorists who tool by under the bridge don't know that the crack has a name and a history, or that Dave May is mad at it, but it does and he is. The crack is about one-and-a-half-inches wide and 20 feet straight up, a rough gap between two separately cast bridge supports. Some climber has removed all of the mortar that once filled it. What is left has nothing that could be called a handhold, but boulderers are resourceful. If you thrust your toes in sideways and twist, your foot will support you. If you jam your fingers into the crack and try to make a fist, your hand will stick there (and if you have wound your knuckles with surgical tape

before you started, you may not lose too much skin).

Today nobody feels like climbing the crack unbelayed, so one of the boulderers secures a climbing rope around a guardrail above the abutment and knots a loop at one end. The loop is clipped into a caribiner—a snap ring—attached to the waist harness of the first climber, a very lean woman named Amy, who wears a tank top and shorts. As she stands waiting to climb, her body shows unusual muscle definition, and as she moves smoothly up the crack it is clear that the ascent is not simply a matter of balance and delicacy, but of massive, sustained effort. There is no resting point; the choice is to finish the climb or peel off.

A male climber jams his way up the crack without much trouble, and then Ann tries. She is slim and strong, but she does not have the arm power of Amy. She hesitates at each step, tires herself and pops off the wall halfway up. Her belayer lowers her to the street. She rests, then has another go. This time she flows from hold to hold and makes the top. Cheers from the other climbers and a tired grin from Ann as she jounces back down on the belay rope. One of her hands is bleeding at the knuckles.

We all bouldered when I was a boy, although we didn't know it was called that. We also treed, barned, house-under-constructioned and garaged. These last three activities would now be called "buildering," and there are climbers who prefer cathedrals and university buildings to granite cliffs. Friends of mine and I, loony with adrenaline as a result of listening to the Superman serial on the radio (an activity my parents had the kindness and wisdom to forbid, which made its effect even more electric), would climb in a pack into a medium-size tree near the town dump, and a kid who had remained earthbound would saw the tree down. Everyone would yell "Timber!" and we would ride harmlessly to earth.

We never hurt ourselves, and our parents never found out what we were doing. Do adult boulderers saw each other down in trees? I have never heard of one, but I know a man who kept a full rig of mountain equipment, including pitons, Jumar ratchet ascenders and etriers (small rope ladders) for climbing giant trees on an estate in Virginia.

There are more people than one might think who have made strange ascents. I find myself discussing bouldering and buildering with a middle-aged Spaniard who is a philological scholar. He is eager to talk, but I seize the floor and tell him how, as children, my friends and I would wedge ourselves upward between the trunk of a sizable tree and the side of a two-car garage, feet against the tree, back against the garage (inventing a technique called chimneying when it is applied to large vertical cracks in rock faces, I learned later). Then we would run across the top of the garage, leap giddily across a frightening, 18-inch gap between the garage and another tree, walk a limb that let us down on a neighboring garage and jump off into a mean old lady's lily-of-the-valley bed.

"I climbed a dormitory using a drainpipe"

My Spanish friend tells me that when he was a young man he climbed the outside of the tower of the Cathedral of Burgos, to celebrate his success in passing his baccalaureate exam. This was forbidden, of course, but it was also traditional. Ah yes, say I, since it is my brandy and my house: when I was in college I climbed a dormitory, using a convenient drainpipe. On another occasion, while baying at the moon, I ascended a large memorial arch. I disgraced myself on the arch (foolish memory floods back as I say the words); a crowd had gathered on the steps below to hear a political speaker, and everyone including the speaker fell silent when I materialized overhead. It was the moment for greatness to reveal itself in a volcanic oration in favor of Adlai Stevenson or liberalized coed visitation rules. Alas, I had climbed merely to hear a girl say "No, you idiot" in a voice that addled my wits, and I had no words for the multitude. I crept down.

Years later I found the drainpipe technique described approvingly in a splendid old book called *The Night Climbers of Cambridge*. It is a Dead Sea Scroll of buildering, a manual published in 1937 for performing most of the known routes on the ancient Gothic university buildings at Cambridge, England, especially King's College Chapel. Such climbs were grounds for expulsion and so were performed at night. A discussion of whether alcohol helps in climbing is left open. The author says both drunkenness and sobriety have been tried. That may be so, says my Spanish friend; there is no accounting for the English.

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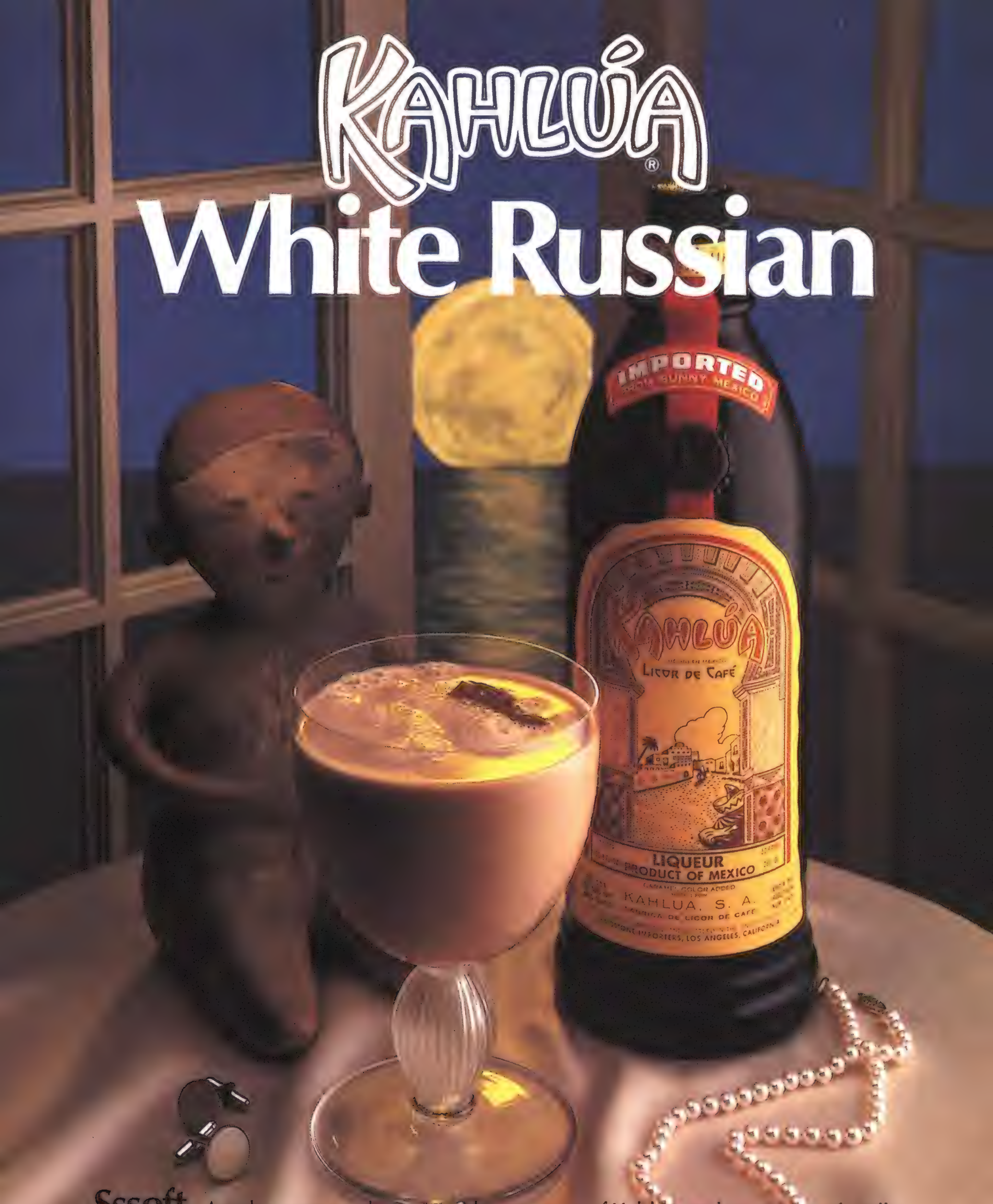

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A bouldering expert who does no other rock climbing, Fred Cook more or less eases his way up Indian Rock.

He himself, however, would on no account have begun his cathedral climb without a steadying ballast of wine.

Some months after my visit to Indian Rock I found a master boulderer in, of all places, Boulder, Colorado. He is Paul Sibley, a mountaineer who runs both a cabinetmaking business and an outfit called Boulder Mountain Guides. If you could build a climber from an engineer's specifications, he might turn out something like Sibley: medium height, unusually wide shoulders, hands and forearms that look as if they were mislaid by a much bigger man, narrow waist and hips, strong, chunky calves. His fingertips are so hard and worn by rock that when he was arrested some years ago, for a nighttime climb of the University of Colorado physics building in Boulder, the police were not able to take prints. He speaks of bouldering as "trying to pour water uphill"—very difficult, very fluid.

Sibley guides on Mt. McKinley, in Peru, in Nepal. He does his bouldering in Eldorado Canyon, near his home. We have agreed to spend some time there, but the weather has turned damp. We talk, as climbers do to pass the time when they are holed up on a bivouac. He is 38, old for a boulderer. Sibley's problem with age is not a matter of strength; he can do a one-arm pull-up with either arm. His reflexes are still good. The trouble is with the landing when he pops off an undoable route; he is not as flexible as he was. It is getting harder to bounce.

This intimation of middle age sets him to thinking about his youth, about chain walking between stanchions that guarded a parking lot in Boulder ("It's really much harder than you'd think; try it"), and buildering on elderly downtown structures whose last few courses of bricks "came out like dresser drawers." You would reach up and grab a brick, Sibley says, and it would come out of the wall. So you would put it back, carefully—all this 30 feet in the air, while you held on to something almost as shaky with your other hand—and then use it as a fingerhold, taking care to load all of the weight straight down. He talks mistily about the days when climbers would go up the U. of C. library and sign their names on the lintel, as if it were a register on a mountain peak.

Like a concert pianist, like a flutist

Sun steams the walls of Eldorado Canyon dry, or nearly dry, and Sibley demonstrates some of his bouldering routes. At the base of a climb called Bastille he does a long, difficult traverse, delicately crossing his feet at one point the way a concert pianist will cross his hands. There are fragile pinchholds on this traverse that change to one-finger presses as Sibley moves past them across the rock, and as he performs them with the precision of a flutist it is hard to remember he is supporting his weight with this artistry.

This appearance of ease is part of a problem that worries Sibley. If what you are watching is simply bouldering, it doesn't much matter if a great climber's fluidity sandbags you into thinking a route is easy. You reach the hard part, discover that you are standing on nothing and you hop down a few feet, muttering the profanity of your choice. But a deadly and beautiful offshoot of climbing these days is the "third-classing" of difficult routes far above the ground. Moving on natural terrain is classified by climbers in the following way: Class 1 is flat trail walking; 2 is for hilly country; 3 is bushwhacking with occasional use of the hands; 4 is scrambling in which hands are used almost constantly, with the occasional protection of belay ropes; and 5 is very steep climbing in which, it was once assumed, protection will almost always be necessary. Class 5 climbing a few years ago was subgraded from 5.0, 5.1 and 5.2, easy for athletic beginners, up through the extreme difficulty of 5.9. Then, as people like Sibley extended the standards of difficult climbing, it was necessary to add the decimal anomalies 5.10, 5.11, 5.12 and, lately, 5.13.

There are climbers, Sibley notes, who now do 5.12s with no more equipment than shoes and a chalk bag. They are thus treating extreme Class 5 climbs on big walls as if they were Class 3 hiking: third-classing. A phenomenally talented climber named John Bachar is

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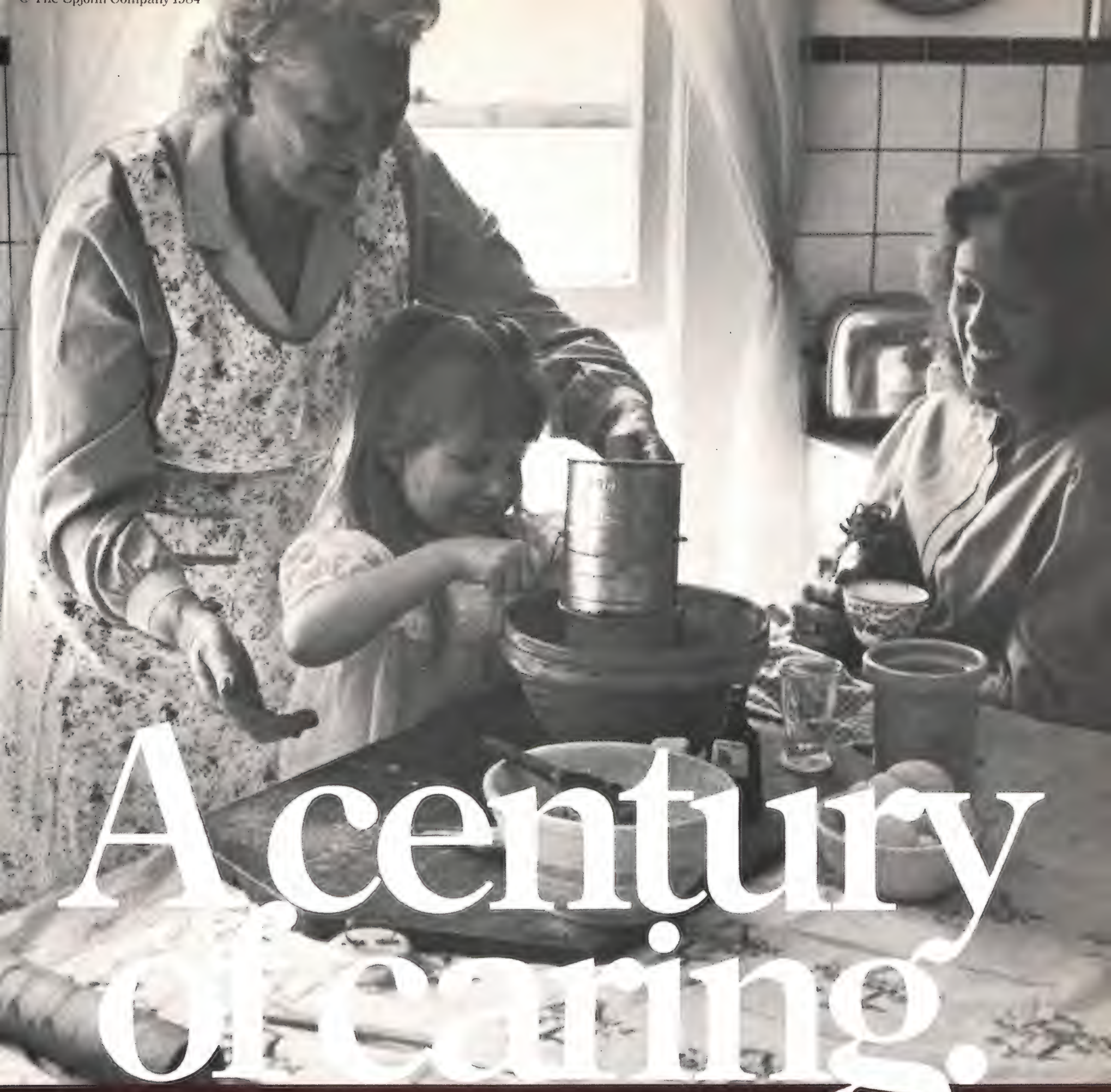

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probably the best known of these people. Dave May had told me that once when he was climbing roped in "the Valley"—Yosemite—doing a high climb he rated at 5.10, Bachar overtook him on a harder parallel route. He was climbing without protection and one-handed, using his free hand to trim the vegetation from a favorite crack with a pair of scissors.

What worries Sibley is that the apparent ease with which Bachar and others perform such gaudy feats will lead relatively inexperienced climbers to try routes—"and they don't even have to be hard"—in which there is no margin of error. Start out bouldering, go a few feet too high in a rush of enthusiasm and suddenly you find yourself in deadly danger.

Despite this, Sibley likes third-classing climbs himself, though in the past couple of years he has been trying to kick the habit like a man trying to cut down on smoking. There is, as it happens, someone third-classing a route directly above our heads. Sibley notices and prudently moves to one side. "Look," he says, "what Bachar was doing with the scissors was an eliminator, in bouldering. You do a route and then you ask yourself if you can do it with one hand, or eliminating certain holds." Chess playing again, I think; give the mountain a handicap by playing without your rook.

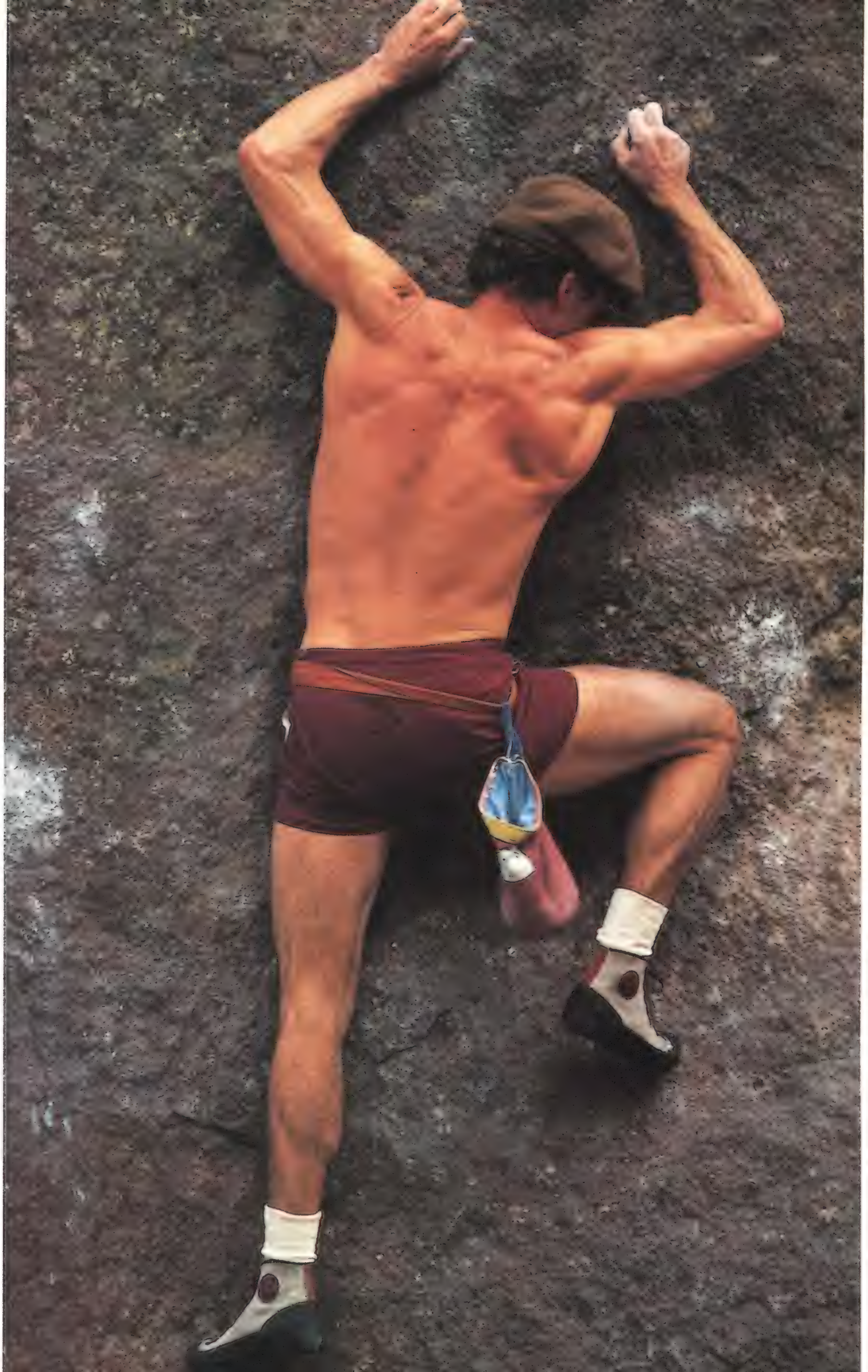
Sibley says that he classes bouldering moves as enjoyable, hard or desperate. (Formal terminology, which no one seems to use, is B.1, B.2 and B.3.) He points to a sharp overhang at the base of a cave called Whale's Tale. This one is desperate and so near the ground that if he peels off, he won't have time to spin and land on hands and feet. For the first time he asks me to spot him, to be ready to break his fall. But he traverses the overhang, his body arched backward and his weight hanging on his fingertips, which cling to the smooth rock at the level of his chest.

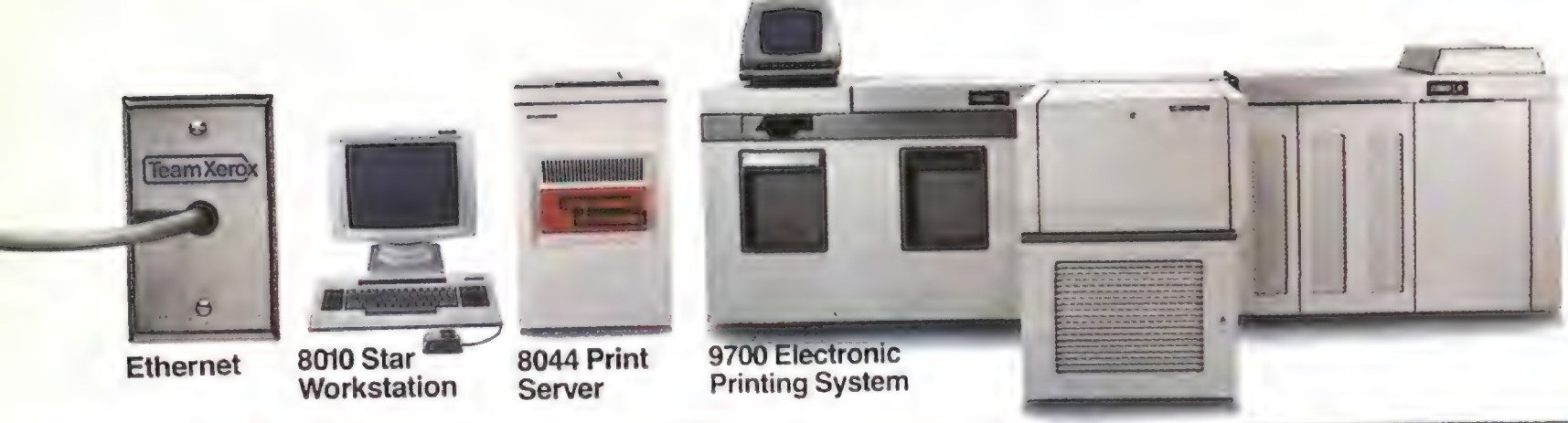
It is almost dark now. The small and whimsical heroics of bouldering are finished for the day. I say goodbye to Sibley, who is thinking "not bad for 38"—I can see it on his face—and who can't stop grinning.

The next day I fly back to New Hampshire, where I live. In my luggage is a secret I do not mention to my wife or grown children: a pair of sticky E.B. sneakers and a chalk bag. On my boulder-strewn acres is a glacial erratic almost as big as Indian Rock. It is covered with moss and lichen, but I am going to get a little brush and clean off a patch of its flank. Then I am going to look for a hold and put my hand on it, and look for another hold, and then see how it feels to get my feet off the ground and on the granite.

"Peeling off," an indulgence high-rock climbing does not permit, a boulderer drops safely to the ground.

A study in effort and concentration, a climber feels for some workable route up a forbidding surface.





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By Marquis Childs

A novel aquarium depicts the story of Monterey Bay

Marine habitat is the theme of a dramatic new complex that hugs the sea in John Steinbeck's old Cannery Row neighborhood

Ed (Doc) Ricketts, model for a biologist in Steinbeck's novel about Cannery Row, studied marine life there.

John Steinbeck set his 1945 novel *Cannery Row* on the waterfront in Monterey, California, at a time when the sardine fleet there was still making hauls and the town's ramshackle processing plants and gaudy honky-tonks were still going full blast. One of the central characters, a bohemian biologist named Doc, is the sole owner and operator of a curious enterprise called the Western Biological Laboratory. His business is collecting and selling sea animals—sponges, starfish, urchins, crabs. His lab and living quarters are located in a low building near the Hediondo Cannery and across the street from Dora's Bear Flag Restaurant and Lee Chong's grocery store, where Doc buys his beer. The storeroom in Doc's place is full of animals preserved in jars. The backyard contains concrete tanks for sharks and octopuses. When he is not busy embalming specimens in the basement or entertaining friends upstairs, Doc can generally be found scrounging around in the local tide pools for critters.

Steinbeck modeled Doc on his good friend Ed Ricketts, whose biological supply business on Ocean View Avenue was across the street from Flora Wood's Lone Star Café and the Wing Chong Market, and about a block away from the giant Hovden Cannery. Ricketts was not quite as colorful as his literary personification, but he was a pioneer in the study of marine life along the Pacific coast. He died in 1948 after his car collided with a train at the Drake Avenue crossing just off Cannery Row. Most of Monterey's canneries went out of business in the 1950s when the sardines disappeared. The last operating plant, the Hovden Cannery, shut down in 1972.

Today, what's left of Cannery Row has been turned into a lively tourist center full of boutiques and chichi seafood restaurants. It's hard to know what Steinbeck and his friend might make of it all, but there is at least one new attraction in their old neighborhood that Ricketts would like very much. That is the stunning Monterey Bay Aquarium, one of the largest and most innovative public aquariums in the country, and almost certainly the most technically advanced. Situated, fittingly enough, on the former site of the Hovden Cannery, and cunningly designed to resemble its predecessor, the $40-million facility opened its doors for the first time last fall. Since then well over a million people have visited the aquarium to enjoy what amounts to a leisurely stroll through the ocean without getting wet.

The Monterey aquarium eschews the traditional presentation of windowlike displays featuring fish from all over the world. It focuses specifically on the diverse marine habitats found in Monterey Bay itself, and it doesn't just show them to you—it lets you experience them. An awesome three-story tank filled with 335,000 gallons of seawater, for example, contains

Diver feeds hungry fish in three-story-high display of kelp forest at Monterey Bay Aquarium in California.

Photographs by Ted Streshinsky

Cannery Row's exciting new aquarium

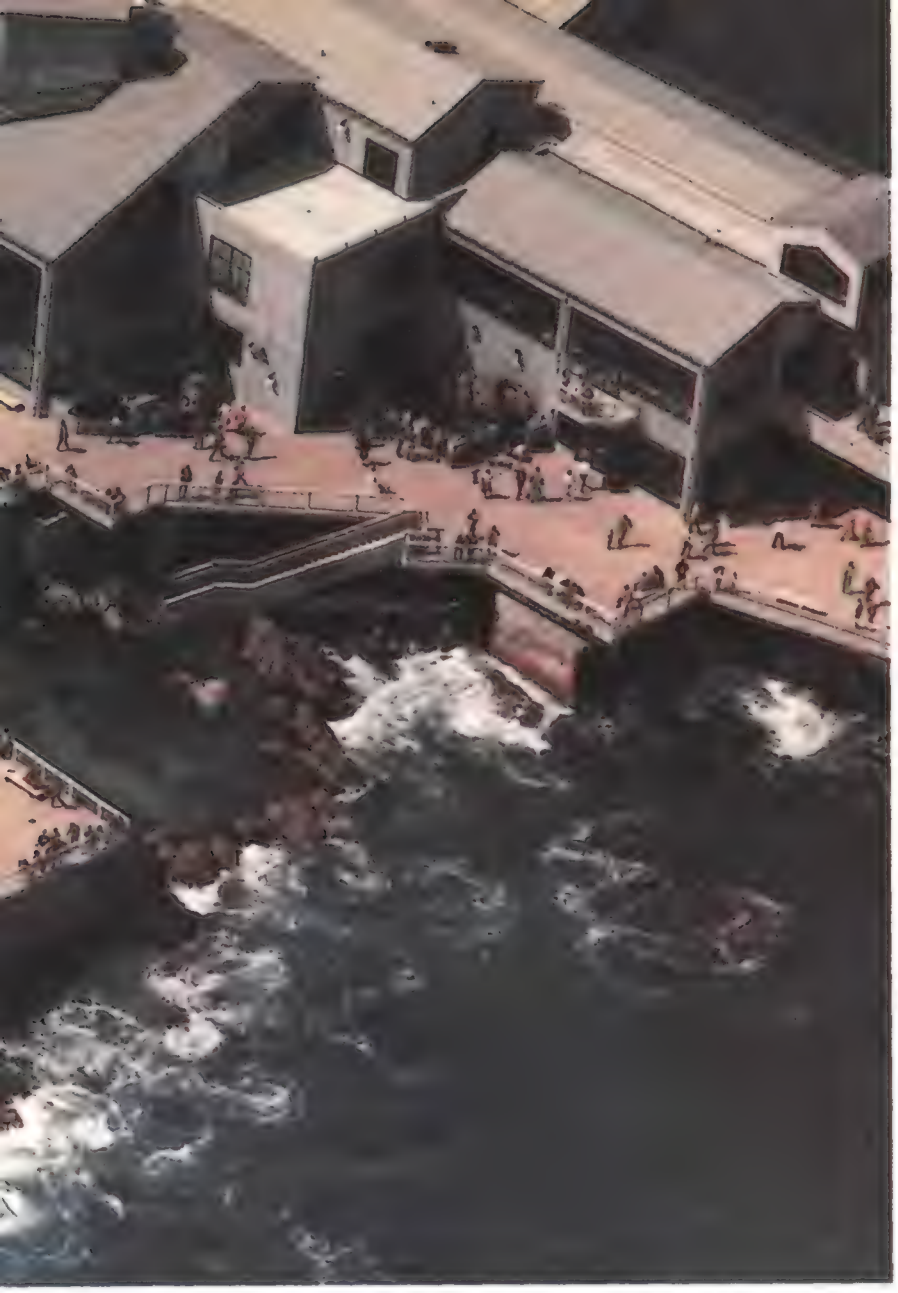
Resembling an old Monterey cannery, the aquarium wraps around a tide pool enclosed by artificial rocks.

Children satisfy their curiosity about sea stars and other creatures at one of aquarium's "touch" pools.

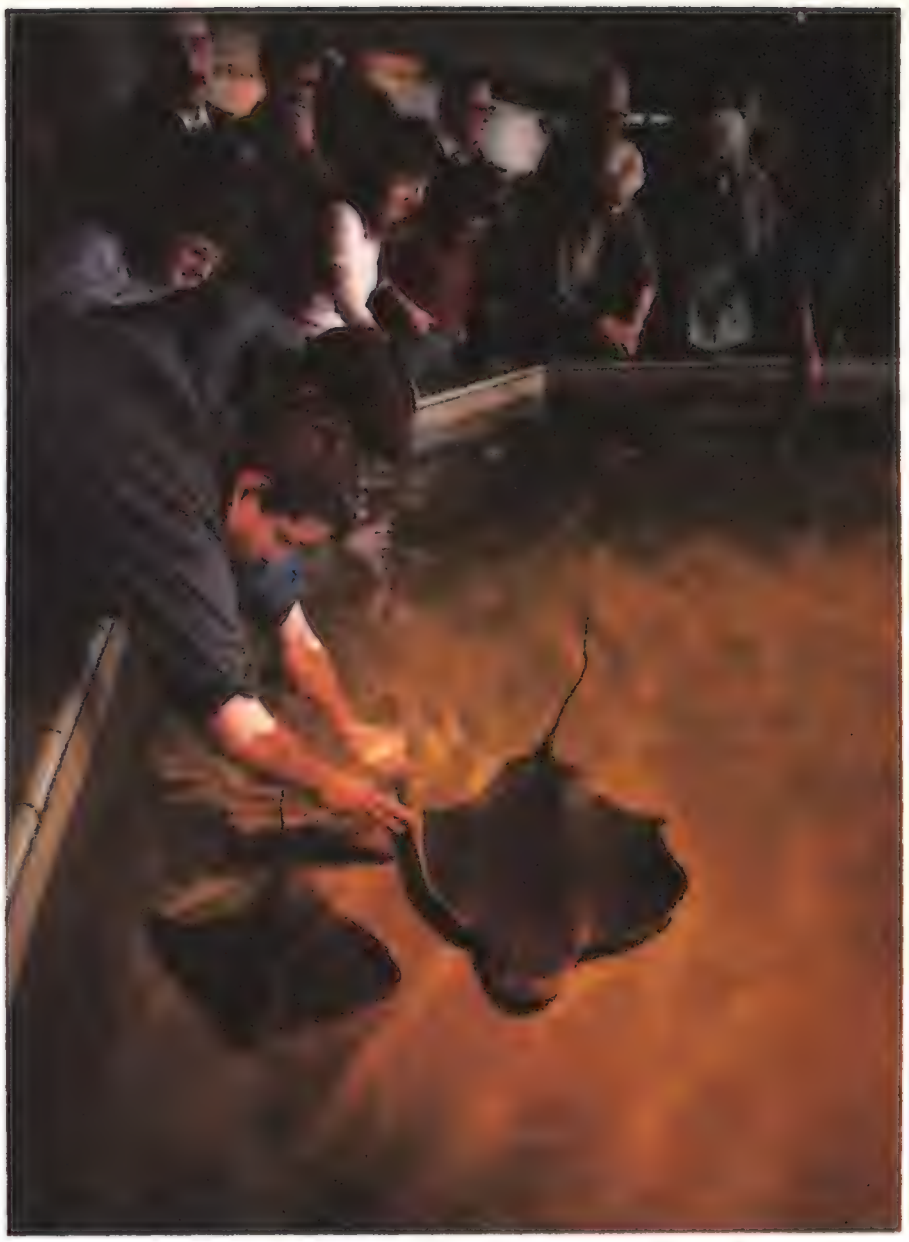
a towering giant-kelp forest, the first ever raised in captivity. Another huge tank, 90 feet long and shaped like an hourglass, features sharks, bat rays and other pelagic fish gliding over a dramatic representation of Monterey Bay that includes deep reefs, sandy seafloors and 30-year-old wharf pilings encrusted with barnacles. Outside, an elaborate tide pool nourishes a community of intertidal creatures augmented, now and then, by visiting sea otters and harbor seals.

Other galleries and exhibits reproduce everything from a coastal stream complete with steelhead trout and salmon to a slice of rocky coastline. There is a walk-through aviary teeming with shorebirds. There are even two "touch pools" where children can pet rays and pick up starfish, sea cucumbers and snails. Altogether, more than 80 "habitat tanks" exhibit 5,500 specimens representing nearly 375 species.

The aquarium's inner workings are impressive, too. The lifeblood of the place is a constantly circulating supply of fresh seawater. It is drawn from the bay at the rate of up to 2,050 gallons per minute by one of two 16-inch pipes nearly 1,000 feet long. During the day, the water is partially filtered to keep the exhibits from clouding up. At night, filtration is reduced to ad-



Most displays are located in one wing (top right), but sea otters live in an outdoor tank (left center).



Bat rays in another "touch" pool may look forbidding, but they actually warm up to visitors who pet them.

mit the natural organisms that nourish the aquarium's animals and plants. A master console constantly monitors the filtering system. In the event of a nearby oil spill—something Californians have been jittery about since the 1969 debacle at Santa Barbara—the outside intakes can be shut off and the aquarium can operate on its own, as a closed system, for up to two weeks.

There are many other interesting touches. Periodically, a bullet-shaped torpedo called a "poly pig" is shot through the intake pipes to clear away barnacles and other marine deposits. The water in the kelp-forest tank is roiled by a surge machine that emulates the movement of water in the kelp's natural environment. Without that constant motion, kelp—one of the fastest-growing plants in the world (SMITHSONIAN, September 1976)—is not able to extract the nutrients that it needs from the ocean.

A different kind of machine in another tank simulates waves crashing against the shore. In the aviary, a device induces shallow water to lap gently upon a sandy beach. Spectators in the rocky-shores gallery can control a video camera that zeroes in on tiny organisms. Throughout the aquarium, special plastic coatings are employed to resist corrosion, which is an ever-present problem in such a briny setting. But the aquarium's proximity to the bay presents certain technological advantages, too: the building's temperature is controlled by a heat-exchange system that uses nothing but ocean water.

All of this clever engineering is due in no small part to the fact that the aquarium's chief benefactor is none other than David Packard, cofounder of the Hewlett-Packard electronics firm in Silicon Valley. Packard is something of a mechanical genius. In addition to underwriting the development and construction of the aquarium, he has personally helped design and build many of the gimmicks that make it go.

David, age 72, is not the only Packard who is associated with the venture. Daughter Julie, 32, is the director. Daughter Nancy, 41, is one of four marine biologists working in the Monterey area who thought up the idea back in 1977. Her husband, Robin Burnett, is also a member of the group. A bronze plaque in Julie's office wryly sums up the spirit of the enterprise:

A widely syndicated newspaper columnist in Washington, D.C., for more than 20 years, Marquis Childs now lives in San Francisco.

Sharks, rays, salmon roam tank that re-creates a slice of Monterey Bay, including its reefs (circular window).

Nose-to-nose with a whiskery sea otter, aquarium diver gets the young animal acclimated to exhibit tank.

Giant Pacific octopus uses the suckers on its arms to make its way across the window of a tank.

"Don't start vast projects with half-vast ideas." And the aquarium's lofty goal is a suitable expression of that sentiment: to promote public knowledge and awareness of the dynamic and fragile marine world.

As it happens, the ocean is particularly dynamic in the vicinity of Monterey owing to the nearby presence of a tremendous trench about 70 miles long and 10,000 feet deep. For five or six months every year, this submarine canyon undergoes an upwelling of its nutrient-rich cold waters, which fuel the entire region's complex food chain. That phenomenon, together with the remarkable variety of habitat extending from the Monterey Peninsula south to Point Lobos and beyond, makes the bay area one of the world's richest biological treasure chests.

It is this richness that the aquarium's organizers and architects—Esherick, Homsey, Dodge & Davis of San Francisco—set out to celebrate. In their quest for ideas and advice, planners visited aquariums and museums all over the country, consulted with leading marine biologists and educators and interviewed veterans of the old Cannery Row. It took three years to come up with the design and four more years to construct the building. The result is notable not only for its "fidelity to nature," as Donald Kennedy, president of Stanford University, put it during the opening ceremonies last October, but for its shrewd blending of entertainment and education as well.

Teaching materials and an orientation show

The aquarium contains two classrooms and an auditorium. Teaching materials and instructors are provided for visiting classes. In the "introductory theater," visitors are shown a short slide show to prepare them for what they are about to encounter.

Elsewhere, education is less formal but no less effective. In the airy marine-mammals gallery, life-size plastic replicas of some of the more spectacular creatures that can be seen in or near Monterey Bay are suspended from the ceiling: killer whales, dolphins, a 43-foot gray whale and her 22-foot calf (gray whales migrate right past the Monterey Peninsula), sea lions and seals. Graphic displays and video programs explain why the bay is a haven for such creatures.

One of the aquarium's most popular attractions is the 55,000-gallon sea otter exhibit. By the turn of the century, sea otters were hunted almost to extinction; today their population numbers around 1,500 in California and many of the animals make their home in the kelp forests off Monterey Bay. Three of the aquarium's resident sea otters were separated from their mothers in a storm in the winter of 1984. The fourth was abandoned by its mother. Rescued and raised by the aquarium staff, the orphaned pups had little diffi-

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Braking 60-0 (ft.)	6 (129.2)	3 (135.7)	4 (135.2)	2 (143.1)	1 (144.7)	5 (135.1)
Slalom (sec.)	6 (6.13)	3 (6.38)	5 (6.33)	4 (6.36)	2 (6.40)	1 (6.62)
Lateral Acceleration (g's)	5 (.91)	6 (.92)	4 (.86)	2 (.83)	3 (.85)	1 (.82)
Price as Tested	$26,703	$103,700	$26,121	$60,370	$50,384	$49,495

Scoring based on an Olympic system in which first place is awarded 6 points for each event. USAC certified tests, January 1985. All cars listed were latest models available for sale in the U.S. at time of testing and were equipped with various high-performance options. Corvette's Manufacturer's Suggested Retail Base Price is $24,891 including dealer prep. Tax, license, destination charges and optional equipment additional.

TODAY'S CHEVROLET

culty adjusting. That's probably because the staff has bent over backward to accommodate them.

Normally sea otters feed on shellfish, breaking open the shells by hammering them against a rock. But in an aquarium setting the frisky animals could use the jagged pieces of broken shell to scratch the windows of their tank. To get around this problem, the Monterey aquarium feeds its otters away from the viewing area. However, daily feeding shows are presented to demonstrate the animals' voracious appetite. The sea otter's metabolism is so high that it must eat 20 percent of its weight every day. That means the nonprofit aquarium must spend $10,000 a year on food for each otter.

The entertaining animals are a perfect complement to the aquarium's relaxed atmosphere. On any day of the week, parents can be seen pushing strollers through the galleries. Youngsters crowd eagerly around the touch-and-feel exhibits. With the sunlight flooding through its open tank top, the kelp forest casts dramatic shadows. Many of the visitors are tourists from all over the country and, judging from the look on their faces, they have never seen anything quite like the aquarium. "I think it's great," a woman from Omaha enthused recently. "I never dreamed I would know so much about what is under the ocean."

The aquarium is concerned with events that have transpired above the ocean, too. The restored boilers from the Hovden Cannery are on display and an exhibit explains how the canning process used to work. Another exhibit currently being assembled will tell the story of the various ethnic groups that have drawn their living from the bay, beginning with the early coastal Indians. And then there is the tall glass display case near the touch pools. Hanging on the wall nearby are three large photographs of an intense, wiry fellow: first, out on the rocks of a tide pool: next, seated in a laboratory surrounded by jars full of specimens; finally, holding a small shark. In the case are a large glass jar containing a three-foot squid, an old newspaper clipping, some laboratory equipment and a 1945 hardbound copy of *Cannery Row*. Perhaps you would have to be familiar with the novel, and with the true story behind it, to understand that this curious collection is a monument to the memory of Ed (Doc) Ricketts, the marine biologist who used to live just a few doors down the street.

They may look like flowers, but anemones in sandy seafloor exhibit are actually animals that epitomize phenomenon of adaptation. Waving from their tubes anchored in sand, tentacles can trap particles of food.

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HEWLETT PACKARD

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Right at home with his creations, Grooms, the grand proprietor, joins a scene of his *Ruckus Manhattan.*

Cutout tableau celebrates famous bash given for Douanier Rousseau in Picasso's Paris studio in 1908.

By Judd Tully

Red Grooms has artful fun with high culture—and low

There's a great deal of good humor when he sets his merry-go-round world spinning—but there are needles and sharp edges, too

When Red Grooms—caked in whiteface—tumbled backward out of his *Burning Building* set in December 1959 onto the creaky floor of his Delancey Street Museum, the cagey New York art world sat up and took notice.

The fresh-faced 22-year-old with the shock of carrot-colored hair combined theater, circus and brash expressionist painting, creating one of the first Happenings that in many ways signaled the end of the formidable Abstract Expressionist epoch and the beginnings of what became known as Pop Art.

This month in Philadelphia, at the Pennsylvania Academy of the Fine Arts, audiences will have their first chance to see 29 years of his work in Grooms' first major retrospective. The show has been supported by the Atlantic Richfield Foundation.

A master of many media, Grooms' sprawling exhibition of 170 objects will show not only painting, sculpture, prints and drawings but a skyline of towering "sculpto-pictoramas" from *The City of Chicago* to the dragon-clad *Woolworth Building* in *Ruckus Manhattan.* The artist's considerable film oeuvre will be screened behind the elaborate *Tut's Fever* marquee, a sneak preview of his portable movie palace still in the design stage.

The itinerary for the traveling retrospective, after it departs Philadelphia in late September, includes the Denver Art Museum (November 2 through January 5,

Private collection

Picasso, below sign at center, raises glass; Rousseau fiddles at right; Apollinaire orates between them.

1986), the Museum of Contemporary Art in Los Angeles (March 12 through June 29, 1986) and back to the artist's roots in Nashville at the Tennessee State Museum, where it runs from August 17 through October 26, 1986.

Three months before the exhibition, which opens on the 21st of this month, I visited Red Grooms late one afternoon in his Manhattan studio a block away from the main drag of Chinatown. He greeted me at the door, introduced Tangra, his Tibetan terrier, and placed a cold can of beer in my hand before I could get my notebook out. Backpedaling to the dining table he picked up a brush and quickly dispatched some gouache over a lithograph titled *Lorna Doone*. Leaning over the table, painting and talking, he could just as easily have been shining shoes. He apologized for the slight delay, gesturing to the grinning, leopard-skinned lady sprawled on a wheatfield (in a pose that was disturbingly reminiscent of Andrew Wyeth's *Christina's World*): "I've got to send her out tomorrow."

Leaving *Lorna Doone* to dry, we repaired to the living room. I wanted to know how Grooms felt, with the approaching triad of retrospective, Carter Ratcliff's Abbeville Press coffee-table monograph and the museum's own hefty catalog. "It's staggering and numbing but it hasn't been an overnight thing. The retrospective," he continued, "has been in the works for two years and the Abbeville book for at least four, so there's been a spread of like five years with this calamity coming down on me in junior middle age, like a TV episode of *This is Your Life*."

Looking at Grooms it's hard to believe he's pushing 48. Stretched out in a leather-and-chrome Wassily chair, one long paint-spattered jeans leg crossed over the other, his flannel shirt and wool lumber jacket buttoned up to ward off the loft's chill, he filled the air with his Tennessee twang.

I was curious about his range in subject and style,

Pennsylvania Academy of the Fine Arts

Benjamin West's painting, *Penn's Treaty with the Indians*, 1771, is a classic American landmark.

Grooms' version, *William Penn Shaking Hands with the Indians*, is homage to West—with a slant.

from watercolor landscapes of Caribbean isles to Manhattan cityscapes gridlocked with bizarre bag ladies and purple-coifed punksters; from the small intimate portraits recalling the calm bourgeois interiors of Vuillard to a life-size replica of a grungy Manhattan subway car, lurching on truck springs and peopled with a cast of plaster figures that rivals the gruesome stories in the pages of the *New York Post*.

"It's very confusing where my taste for this academic painting comes from, but I've always had it and it runs counter to my burlesque style. I guess they're just two sides of a coin. Those are the two things I really like—either completely burlesque or just very controlled." What the artist calls burlesque is a highly sophisticated form of theater. He is in the truest sense an action painter.

Two paintings from the retrospective illustrate this dichotomy of style. *Don't Walk* (1963) is a traffic planner's nightmare; pedestrians jam the foreground with a queasy assault of long strides and clashing textures of jackets, shoes, hats and handbags. The city dwellers walk like robots, impervious to the clotted traffic waiting to bear down on them from the crosstown street. Traffic lights blink, cops scowl and a crowbar couldn't pry one more figure into the scene. An anthropologist could pick at the painting for cultural clues. The breathless style, the jabbing caricature of New York's frumpiest, recalls the quick-draw pen of Honoré Daumier and his 19th-century spectacles of Parisian theaters, salons and street life. Daumier too became a sculptor, as if the scratchy lined technique was not enough to satiate his appetite for details. Daumier painted his clay sculptures, distorting features to the edge of bad taste. Grooms jumped—as Daumier did—to the third dimension.

Kids Watching Me Paint (1961) has an ethereal air, far removed from the anarchy of *Don't Walk*. A cerebral notion informs the canvas, painted with a smooth, soft realism on a bank of the Arno in Florence. Intent on capturing the beautiful green hills framing the city, Grooms noticed a bunch of young spectators watching him work. Inspired, he turned the canvas around to paint their faces blushing in the landscape. "In the moment of being on holiday I could indulge in that particular taste I had for the naturalistic," says Grooms. "The curator has done a good job interweaving that stuff in with the buildup of the big pieces." While working in this traditional, academic form, Grooms can't restrain his intuitive impulse, painting a kind of play within a play. Mischievous spontaneity is the touchstone of his style.

Pennsylvania Academy curator Judith E. Stein has organized the exhibition around specific themes that have obsessed Grooms since the 1950s. It includes city life, art about artists, global politics, sports, portraits of friends and family and a cavalcade of self-portraits in a diverse range of media. According to Grooms, theme has been a key to his work, the one thing that keeps him in line. "Outside of it," predicts Grooms, "my work would be overly spontaneous if I didn't force it to stick with certain themes. You can make 'stuff' but you're only given a certain amount of inspiration and it has always been critical for me to tie that to a pertinent subject. The city theme, for instance, sometimes takes a backseat to the personal thing; the experience of traveling, to go to new places, has been a big influence."

Since his boyhood in the suburbs of Nashville, Grooms has had a hankering for travel, fueled by the

Denver Art Museum

nomadic carnivals and circuses that trooped through Nashville's state fairground. An ad in *American Artist* magazine for the Famous Artists School in far-off Connecticut lured him to subscribe to a correspondence course in commercial art: "We're looking for people who like to draw! . . . Let our Talent Test. . ." the ad implored. But he soon tired of his assignments being returned first-class with the red-penciled corrections obliterating his original work.

Grooms saw Jackson Pollock's *Sleeping Effort* in Nashville's cavernous Parthenon (a full-size replica of the Athenian temple). This late masterpiece was part of "A Collector's Choice," a traveling exhibition organized and circulated by the American Federation of Arts. For Grooms it was an epiphany. At this point he decided to pursue "fine art."

He left Nashville for Chicago and the School of the Art Institute shortly after his high school graduation in 1955. He'd already had a successful two-man show with his friend Walter Knestrick at Nashville's Lyzon Art Gallery, which doubled as a frame shop where Grooms worked part-time.

Judd Tully writes on the contemporary arts, lives on the Bowery, a real-life Red Grooms scene, and is author of a study of Grooms' Ruckus Manhattan.

Although bewitched by Chicago's skyline, his brush with the school was a fiasco. He quit after two and a half months and returned home, only to leave again for New York and a painting class at the New School for Social Research. Again he was bewitched by metropolis and disappointed with school. "I really didn't want to be told what to do," Grooms would tell an interviewer years later. It was back to Nashville, a restless year spent at a teachers' college and a third try up north to Provincetown on Cape Cod and the esteemed Hans Hofmann school (his mother had read about it in *Time* magazine). Grooms dropped out again, but this time he had stuck around long enough to be swept away by the art scene.

Those early impressions of city life, of architecture and bridges, of anonymous faces rushing to unknown destinations, were gathered in little notebooks, marinating over time into the 3-D "novels" of *City of Chicago* and *Ruckus Manhattan*. Whether it be Paris or Cairo, Grooms has a genius for capturing the texture and mood of a particular place, peeling away layers to reveal the soul of the city.

It is now 1957. The Beats are in. Jack Kerouac's *On the Road* and Allen Ginsberg's "Howl" are underground best-sellers. Action Painting is the new religion. American cars sprout tail fins and chevrons of

Collection of Paul Suttman, Brooklyn

After great success in New York, Grooms left for Italy and painted portrait of wife-to-be Mimi, 1961.

chrome. The Cold War dominates the news while cool jazz and poetry waft through the cafés and smoky nightclubs. The traveler Grooms falls in love with the bohemian scene.

Cooperative galleries sprang up in the downtown streets of Manhattan. They were dedicated to showing an alternative to the Abstract Expressionists (de Kooning, Guston, Kline and Pollock) who dominated 57th Street and made New York the world capital of contemporary art. Grooms gravitated to East 10th Street and the company of Lester Johnson, Allan Kaprow, Alex Katz, Jan Müller, George Segal, Lucas Samaras and Bob Whitman, all of whom pursued styles diametrically opposed to abstraction.

In the three years Grooms traversed the New York-Provincetown art circuit—a time as breathless as the unedited prose of Jack Kerouac—he opened City Gallery with his friend Jay Milder, exhibited two unknowns, Claes Oldenburg and Jim Dine, and captured the fancy of art-world enfant terrible Robert Rauschenberg and the polished art critic and painter Fairfield Porter. Just as art-magazine reviews of Grooms' ten-minute performances and thick-crusted paintings trickled in, he shuttered his second gallery, the Delancey Street Museum, and hung up his Happening hat. Though the time seemed ripe for success, he packed up for Paris. (Sixteen years later, feted by the city and showered by the confetti of rave reviews for his sculpto-pictorama *Ruckus Manhattan*—which he and his wife Mimi built with young artist helpers—Red would flee the limelight again for the anonymity of Paris.)

As in most first landings, his initial brush with the Continent was bumpy. A short spell in a Parisian jail following a fracas outside the café La Coupole hastened Grooms' exit to the friendlier climes of Florence where his friends Mimi Gross and Katherine Kean lived the lives of artist-expatriates. *Via Guelfa Studio* (1961), with its cast of floating figures, captures the liberated artistic spirit.

A homemade picture postcard from Kean's press shows Red and Mimi sketching the lush landscape of a Tuscan hillside. Parked at their side, a horse-drawn carriage, hand-painted from roof rack to spoked wheels, announced from the drop-cloths at its sides, "Il Piccolo Circo d'Ombra di Firenze" (The Little Shadow Circus of Florence). For eight weeks the barefoot group of expatriates toured the hill towns of Northern Italy, performing at dusk with Mimi's hand-shadow puppets, and drank in the sights and sounds of Renaissance art. The horse was christened Ruckus.

The picture of Red and Mimi sketching within whispering distance would be repeated in an endless carousel of images in an endless variety of media over a 15-year relationship that would take them back to New York with sorties to Chicago, Minneapolis, Cape Canaveral and Fort Worth. The sounds of Ruckus' clippety-clops changed into a cacophony of hammers, saws and drills. The artistic racket retained the name of Ruckus, the metaphor for Grooms' walk-in environments. The puppets the young couple manipulated to the delight of tiny audiences in Italy would evolve into larger-than-life-size figures occupying worlds as strange and exciting as those first sights of Bernini's and Brunelleschi's wondrous buildings.

Artists, actors, friends, collaborators

For Grooms the canvas has never been big enough. Film and animation have enabled him to visualize his spectacular notions, making him a kind of D. W. Griffith, the famed director who in 1916 shot *Intolerance* and built a half-mile-long set to accommodate 5,000 extras. Out of Grooms' early experiments of home movies that kept growing, and from his casting artist-friends as actors and collaborators, evolved the sculpto-pictoramas of *City of Chicago* (1968), *The Discount Store* (1970-71), *Astronauts on the Moon* (1972), *Ruckus Manhattan* (1975), *Ruckus Rodeo* (1976), *The Bookstore* (1979), *Welcome to Cleveland* (1982) and *Philadelphia Cornucopia* (1982).

With his first collaborator in 16mm celluloid, the filmmaker and painter Rudy Burckhardt, Red made *Shoot the Moon* in 1962, a project tackled after his and Mimi's Italian sojourn. The 24-minute film was a poetic homage to the French trailblazer of cinema, Georges Méliès, and his 1902 *Trip to the Moon*. The papier-mâché comet was baked in Rudy's oven.

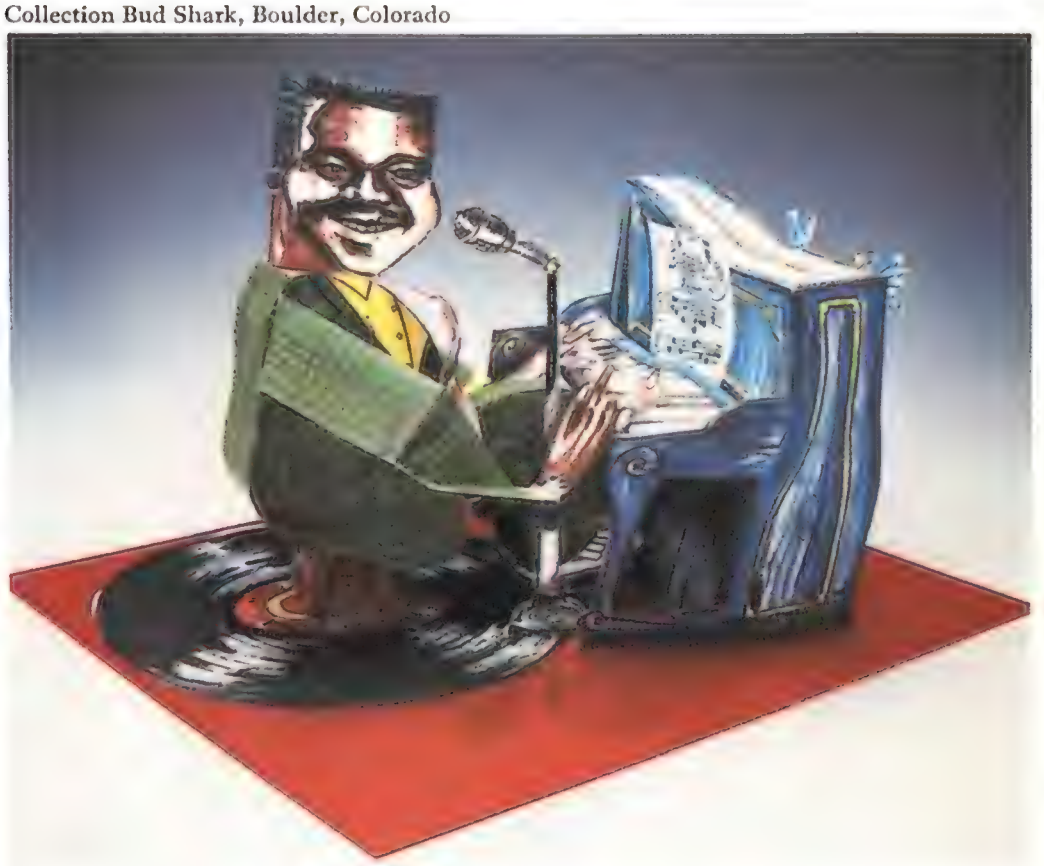
Last year, Burckhardt starred in an unusual Grooms production that required a lavish trip to Atlantic City. Grooms rented a two-bedroom hotel suite, covered the

Collection Brooke Alexander Inc., New York

Grooms has painted and constructed a series of portraits of artists who fascinate him, here of famed surrealist Salvador Dali in confusion, titled *Dali Salad,* 1980-81.

Private collection

Collection Bud Shark, Boulder, Colorado



Inventive lithograph of Fats Domino is a cutout contained in a Plexiglas box, printed by Bud Shark.

Poet Guillaume Apollinaire, a major figure in Paris art circles, is appropriately pictured in a café.

Institute of Contemporary Art, University of Pennsylvania

Martha is figurehead, George commands American Ship of State in *Philadelphia Cornucopia*, 1982.

bed with boxes of Kleenex, yellow legal pads, pills and telephones and had the dapper 71-year-old Rudy strip down to his skivvies to pose as the reclusive Howard Hughes. The culmination: an extravagant painting entitled *The Tycoon* (p.112).

The "germophobic" Hughes is trapped in a culture he helped create. The aerospace titan sits on his bed, illuminated by the beam of the movie projector frozen on a close-up of Jane Russell. His empire is reduced to a hotel bedroom. Grooms loads all of the media stories about Hughes onto his brush and comes up with a portrait that captures the myth of the modern American hero.

On the heels of *Shoot the Moon*, Grooms had his first one-man show in two years at the Tibor de Nagy Gallery in 1963 (he'd had one in 1960 at the Reuben Gallery). Featured in 1963 and part of the current retrospective is a multimedia, cutout-figure tableau, *Le Banquet pour le Douanier Rousseau.* It celebrates the legendary dinner held in 1908 for the eccentric Rousseau in Picasso's own studio in the artists' building in Montmartre dubbed *bateau-lavoir* (laundry barge) by Surrealist poet Max Jacob. Among the guests at this avant-garde "last supper" were Gertrude and Leo Stein, Alice B. Toklas, Apollinaire, Georges Braque, Max Jacob, Lolo (a pet donkey) and a score of other luminaries of the Parisian art scene.

In 12 years at Tibor de Nagy and at John Bernard Myers Gallery, Grooms had ten solo shows. In 1975, Grooms joined the international stable of Marlborough Gallery. A year later, more than 100,000 viewers would troop through Red and Mimi Grooms' "sculptural novel" *Ruckus Manhattan.*

More than meets the eye

For all of the lighthearted banter, Grooms' deadly accurate eye—even when it focuses in front of funhouse mirrors—has created a profound impression of contemporary life. Flipping back through the pages of American art history, no member of any school, from Ashcan to Social Realist and up through Pop and Environmental Art, has captured the soulful fabric of the city with the force Red Grooms has.

Part of that power is journalistic. Grooms is the man on the scene, recording the moment as he sees it, as writer Stephen Crane did with his *New York City Sketches* of the late 19th century. Crane's vivid style, pouncing on artists' garrets, gamblers and con men, Bowery flophouses and Chinatown opium dens, delivered a mix of sympathy and irony, two traits Grooms lives by. While Grooms' ongoing chronicle of the street continues in the great American tradition of John Sloan, Reginald Marsh and Weegee the Famous, he takes another turn and grasps the hand of history.

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Marlborough Gallery, New York

Nightmarish montage on last days of the recluse Howard Hughes (not in show) is entitled *The Tycoon.*

To set scene, Grooms hired an Atlantic City hotel suite, posed filmmaker Rudy Burckhardt as Hughes.

Grooms is no stranger to Philadelphia. His sculpto-pictorama of that city, *Philadelphia Cornucopia*, has resided at the city's Visitor Center since March 1983 after a dazzling run at the Institute of Contemporary Art. Grooms packed 200 years of history into an outrageous ship of state that ferries the likes of Benjamin Franklin, George Washington and a plush-robed Thomas Jefferson chewing on the tip of a quill pen while composing his Declaration. A Martha Washington figurehead guides the prow of the ship as her husband, the General, doffs his tricorne from the forward deck. Nearby, the piercing eyes of architect Frank Furness, the genius behind the Pennsylvania Academy's grand exterior and polychromed interior, survey a life class run by Thomas Eakins—an event, by the way, that got Eakins booted out of the Academy for having a nude male model pose for the segregated women's painting class. That is another story, one of the hundreds spun by Grooms' unquenchable thirst for detail, what he calls a chronic case of horror vacui.

One of the finest paintings in the Academy's permanent collection is Benjamin West's *Penn's Treaty with the Indians* (1771). Grooms, inspired by West's ambitious narrative, tried his hand at depicting the same event in 1967. Grooms' version, *William Penn Shaking Hands with the Indians*, mimes West's. According to Grooms, West painted the large-scale scene on his estate, while standing in a balloon contraption tethered 60 feet in the air. His wife stood by at ground level, keeping him supplied with sandwiches and birch beer during the six-day marathon. The models were recruited from a touring Shakespeare company. Viewers in Philadelphia will have the unusual opportunity of comparing the paintings.

Grooms did another takeoff—this time on Edward Hopper's classic *Nighthawks* (1942), his version entitled *Night Hawks Revisited.* While Hopper creates shadowless isolation outside a window of coffee-shop light, Grooms injects prowling tomcats and a passing car. Hopper sits at the curved counter over a mug of steaming coffee. Grooms steps into the picture depicting himself as the white-jacketed counterman bowing to the icon of realism.

A Room in Connecticut (1984) is the latest painting in the retrospective. Art detective Grooms is in his finest form, taking us, as Edward R. Murrow used to do,

The newlyweds were off to live in America. She had put off saying good-bye until the very last moment.

As always, he had something for her: an antique cameo brooch. "It was your mother's," he said. "I know she'd want you to have it." Then she tried to put her feelings into words.

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into the living rooms of famous people. Marcel Duchamp is seated next to his patron Katherine Dreier, the legendary American collector of avant-garde art. Duchamp's Dada sculpture, *The Large Glass*, looms in 3-D in the foreground (the original is in the Philadelphia Museum of Art, part of the Arensberg Collection). When I asked Grooms about the scene, he said, "I just liked the personalities and the crazy juxtaposition between the avant-garde work and the fuddy-duddy atmosphere."

David Saunders is a 30-year-old New York artist who has worked with Grooms on many a Ruckus and edited a number of his films. "I come back again and again," Saunders said, "to working with Red Grooms. I think our natural tendency is to seek order and we sometimes forget the importance of intuition in our lives. There's no better reminder than to share in Red Grooms' creative process. Working with him is more than executing a preconceived idea: it is a continuous process of inspiration. He can precipitate the kind of lucky accident that to most artists is a precious rarity."

Just as the curator, registrar and team of consulting architects put the final touches on the show's organization, word came from New York that Grooms wanted to forge ahead and build his *Tut's Fever* environment in time for the Philadelphia opening. Nerves began to frazzle. Back in his studio, Grooms adds another figure to his movie-palace marquette, resembling a lavish production number of Hollywood Meets the Nile. The irrepressible showman lacks only funds to build his palace. He has the use of a cavernous studio across the river in Astoria, Queens, on the old Paramount Pictures location where Valentino, the Gish sisters, Gloria Swanson and D. W. Griffith worked. Grooms stands over his doll-house-size model, reaching in to lift James Dean out of a custom-fitted sarcophagus worthy of Tutankhamun. Red laughs and waves the miniature movie star. With a gleam in his blue eyes, he tells me of plans for Tut in a proposed museum at the Paramount site once the retrospective ends.

Now, with his deadline extended to the breaking point and fund-raising efforts exhausted, Grooms must delay construction of his lavish movie palace. His vision of a gold-leafed Sphinx sailing over the heads of the audience seated inside *Tut's Fever* will have to wait. The illuminated marquee will be installed in Philadelphia but the rest of his Egyptian cast hopes for a debut later in the itinerary of the show, in Los Angeles. Red's reverie repeats in a stage whisper, "My head is swimming with the possibilities."

Private collection

Lithographic precursor of three-dimensional *Ruckus Manhattan*, a freewheeling work, is called *Local*.

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NO SMOKING
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KEEP HANDS OFF DOOR
THE CHANCE OF
STRAWBERRY BLOND
THE LIBRARY
WHERE SHE
HOBBIESAR
DELIVER TO EMPIRE NOTIONS
ETNA BYPASSES VILLAGE
OUT ENDANGERS
OTHERS
CITY HALL

Theatrical 1890s painting invokes expedition's tragic climax as the last of Franklin's men collapse around a lifeboat mounted on a sledge they vainly dragged over ice toward safety—1,000 miles away.

By Bil Gilbert

A frozen sailor summons up tale of heroism

Trying to find the Northwest Passage, Sir John Franklin and 128 men perished under still mysterious circumstances

Last year a young Canadian anthropologist named Owen Beattie returned from the Far North with an extraordinary color photograph that he'd just taken. It was of John Torrington, a British sailor who died 139 years ago and was buried by his comrades in an icy grave on remote Beechey Island.

Beattie had exhumed the body, taken valuable tissue samples, then carefully reburied Torrington, all in the interest of science and medicine. But it was the sight of the long-dead sailor's photograph that stirred popular interest. Not merely as a *memento mori*, but because it conjured up one of the 19th century's consummate chronicles of horror and heroism—the loss of explorer Sir John Franklin's last expedition.

Commencing in the mid-1500s, the search for the Northwest Passage—a sea route, north of continental Canada and Alaska, that was supposed to link the Atlantic and Pacific—engaged a number of European mariners and did in not a few of them. But by the early 19th century this project had become largely British, conducted by the Royal Navy. Working westward from Greenland waters, eastward from the Ber-

ing Sea, overland along the frozen mainland coasts, by the 1840s various expeditions had charted all but a few hundred miles of what it was believed would prove to be "the Passage."

In consequence the Lords of the Admiralty decided that one final, massive effort would produce the last, missing pieces of the ancient puzzle, thus bringing glory to the nation and displaying to the world the power and expertise of the modern British navy. Two 300-ton-plus, bark-rigged sailing ships, forbiddingly named *Erebus* and *Terror*, were outfitted for this purpose. They were considered state-of-the-art vessels for Arctic work, both being equipped with, among other innovations, converted locomotive steam engines, each generating 20 units of auxiliary horsepower to help them through the ice. The ships were manned, collectively, by 129 carefully selected volunteers.

Franklin was already an Arctic hero

Overall command was given to a Royal Navy Captain, Sir John Franklin, who had recently returned from serving the Queen as the somewhat bumbling governor of Van Diemen's Land (Tasmania). Franklin was a ranking veteran of the British Arctic Corps, though, having made his reputation from three difficult polar expeditions—one seaborne and two overland—which were carried out between 1818 and 1827. They had been notable principally because of the terrible hardships endured, but because of them Franklin had become and remained a national hero, regarded as a world authority on Arctic travel.

The command of what Britons assumed would be the ultimate Northwest Passage expedition was much coveted. Because Franklin was 58 years old and had not actually been in the Arctic in 17 years, there was some behind-the-scenes, intraservice grumbling that it had not gone to a younger, fitter man, and one more familiar with up-to-date polar techniques. But Franklin was appropriate as the nation's most prestigious Arctic wallah, and there was the old-boy factor, too. Extreme loyalty existed among the Admiralty's Arctic specialists (p. 126). When the matter was under consideration, one of the senior members, Sir Edward Parry, remarked that if Franklin did not get the post "the man would die of disappointment."

With Franklin aboard the *Erebus* and the slightly smaller *Terror* commanded by Capt. F. R. M. Crozier, another veteran of the north, the ships left England in May 1845. On July 26, southwest of Greenland, a whaler met and saluted *Erebus* and *Terror*. It was the last time that any European was to see the two ships or any of their men alive.

A common tactic in those days was for exploring parties to sail into the waters of the eastern Arctic dur-

John Torrington died in 1846, was photographed by scientists in 1984 before being carefully reburied.

As a national hero Sir John Franklin sat for his portrait in the 1830s, after three polar expeditions.

ing their first year out, find a suitable haven and allow themselves to be locked in the ice for the winter, sometimes making overland and ice reconnaissances when the weather improved in the spring. The next summer they might press farther west during the few weeks of open water and, if things went well, spend a second (but seldom by choice a third) winter in the ice. Consequently, there was little concern when nothing was heard of Franklin at the end of the 1846 sailing season. When no word came in 1847, however, the Admiralty began to worry. The next year rescue attempts began. Three ships were sent to the eastern Arctic, three more proceeded east from the Bering Sea and an overland party was dispatched to the Canadian Arctic coast. Then, in 1850, Capt. William Penny discovered the marked graves of three members of Franklin's party on Beechey Island. But these men had died quite early in the expedition and gave no clue as to its future course or fate.

In the next decade 32 expeditions (variously sponsored by the British and American navies and privately funded explorers) set out to find Franklin or signs of him. All but the last were unsuccessful, although in 1854 a Hudson's Bay Company trader named Dr. John Rae bought artifacts that clearly had belonged to the Franklin expedition. Eskimos also told stories of white men found dead to the northwest. Attempts to follow up on this evidence failed.

Season after season as frustrated rescuers returned, public interest became increasingly feverish. It was as if, the technology having become available, John Glenn left the Senate to lead a two-year exploration of Mars and—after blasting off from the Kennedy Space Center—completely disappeared. The fanciful analogy could be taken a step further. John Franklin was married to a woman who herself was a considerable public figure, a celebrity in present-day terms as well known as Margaret Mead or perhaps Jane Fonda.

It is a pity to be brief about the Lady Jane Franklin, for she was an amazing character, in many ways a more interesting and spirited person than her husband. Like Lady Hester Stanhope and a few other well-born, vigorous, but somewhat eccentric women of the Victorian era, she climbed forbidding mountains, ran wild rivers, penetrated strange cultures and courts. She was rich, she was beautiful—an impressively assertive and articulate woman who more or less knew everybody who mattered, including the British royal family, assorted presidents, cabinet officers and tycoons. For a decade, as she spurred on government and private parties, and lashed those she deemed to be laggards, the search for her husband was the full-time work of this formidable woman.

By 1857 Lady Jane leaned hard enough on the Royal Navy to get a leave of absence for one of its best younger explorers, Capt. (later Admiral) Leopold McClintock (p. 124). Adding her own money to what had

Historian and naturalist Bil Gilbert once tried to follow in Franklin's footsteps on route that led to the Arctic coast of Canada.

As hero's indefatigable wife, Lady Jane Franklin helped direct many efforts to find the lost explorer.

been raised by public subscription, she bought a 177-ton yacht, the *Fox*, and sent McClintock off to a corner of the frozen seas where she thought her husband must have gone. McClintock and the *Fox* wintered in the ice off the Boothia Peninsula and then in the spring of 1858 he made an arduous sledge trip to King William Island. There he came upon abandoned supplies from the Franklin expedition, and then skeletal remains of some of its members. Finally, in the ruins of a stone cairn at Victory Point, McClintock's party found two brief written notes, the only firsthand reports ever to be discovered.

They explained that after a successful first season, Franklin had driven *Erebus* and *Terror* to the King William Island vicinity where the vessels had become permanently "beset" by ice. Franklin himself died on June 11, 1847. (His body has never been found and the specific cause of his death is still a mystery.) Then, in April of 1848, for reasons still unclear, Crozier with 105 survivors abandoned their presumably still well-supplied ships and started overland in hopes of reaching Hudson's Bay Company posts 1,000 miles to the south. In fact, many of Crozier's feeble party never got off King William Island. The remains of 30 or more bodies were eventually found on the mainland, northwest of the Back River. None succeeded in walking out of the Arctic.

Thus the official search for Franklin ended. Public interest declined but has never entirely disappeared. In the past 125 years a great body of Franklin literature—retelling as much of the story as is known, speculating about what is unknown—has come into being. Scarcely a decade has passed since McClintock's discovery in which parties have not looked for evidence that might throw more light on the tragedy. To date, sufficient remains have been found to account for the fate of about two-thirds of the expedition.

Owen Beattie's trip to Beechey Island last year was only the latest effort. John Torrington, whose remarkable photograph was brought back, died early in the expedition and was buried on Beechey Island, where Franklin wintered in 1845-46 when the expedition was still in no great danger. But along with the picture Canadian anthropologists have also acquired bones from Franklin men on King William Island and the mainland, too, that may eventually help solve the mystery of how they died.

It was long assumed that—beyond accident—what killed most 19th-century Arctic explorers and most of Franklin's men was scurvy and starvation. However, analysis of one of the previously found bones of the Franklin party revealed abnormally, perhaps fatally, high concentrations of lead. It has been theorized that the lead came from the heavily soldered cans used to store the expedition's food.

Like the Alamo and Custer's Last Stand

It is a behavioral truism that fatal but gaudy disasters—like the Alamo, the Donner Party, Custer's Last Stand—are remembered better and longer than more important and successful events, especially if grisly questions remain about the particulars. This accounts for some of the persistent interest in Franklin and his fate. The loss of the two ships and 129 men was the greatest tragedy in the annals of North American exploration and there remain mysteries beyond cause of death. The wreckage of neither ship was ever discovered, for instance. Since the 1860s, too, there has been speculation, fueled by stories passed along by Indian and Inuit people of the Canadian Arctic, that Captain Crozier and a few other survivors may have roamed about the frozen wilderness, living with clans and tribes, for a decade or more after abandoning the ships.

Beyond the more or less ordinary titillating reasons, there may be another, essentially metaphysical factor which explains the hold that Franklin continues to have on the minds and imaginations of some people. My own enduring interest was strong enough, on one

Small map (above) shows the mostly icebound sea-lanes that can be called "northwest passages," plus Franklin's trips, early and late. The enlarged detail (left) marks the progress of the 1845 expedition and labyrinthine area in which the various searches took place.

occasion, to drive me (and five like-minded companions) into the central Arctic. We were not looking for more remains from the final Franklin expedition but traveling as he did by canoe—through an environment that has not changed appreciably since he was there 150 years ago—and trying to follow the route he took from Great Slave Lake to the Polar Sea in 1820-21. There is, obviously, an adventuring element in our nature that sends us to faroff places for no better reason than that they are there.

During the 18th century it became clear that if a Northwest Passage really did exist, it would have very little commercial value. The search for it in the 1800s was pursued in part for scientific reasons. But for naval officers Arctic exploration also became essentially a matter of sporting interest. By that time the Napoleonic wars had already been won. Britain had the resources for such projects and an abundance of young, war-tempered veterans of good family, too restless for ordinary peacetime enterprises and much in need of heroic diversion.

John Franklin was of this class, though overtly one of its least colorful members. (Even those who admired him confessed that, personally, Franklin was a dull stick.) He was born into a Lincolnshire merchant family, which planned that he would enter the ministry. But, as a ten-year-old on holiday, so the story runs, he first saw the sea and determined to follow it.

Otherwise, however, his responses to the world were more in the style of a Colonel Blimp than of a Lord Byron. He first served, as a 15-year-old midshipman, under Nelson at the bloody battle of Copenhagen in 1801. Immediately thereafter he was employed on a survey ship—commanded by a cousin, Matthew Flinders—charting the South Pacific. The vessel ran aground on Australia's Great Barrier Reef. For three months Franklin and the other survivors were castaways, until rescued by a passing merchantman. Returning home he saw action at Trafalgar in 1805, and later, in the defeat of the British by Andrew Jackson at New Orleans. He was wounded there, and several times mentioned in dispatches.

In 1818, presumably because of his connections and reputation for bravery, he was given command of the *Trent*, one of four ships assigned to the first polar expedition launched by the navy in the post-Napoleonic period. This mission was inspired by the assumption that somewhere west of Baffin Bay there was a continuous Polar Sea. It was reasoned that if bold commanders could enter this body of water from the east, they

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could probably find an exit to the west that would lead them to the North Pacific.

During the next 50 years it was found that such a basin existed (the Arctic Ocean), but it was filled with formidable islands and archipelagoes covered permanently or for all but a few weeks each year with either fixed or flowing ice packs. It was also determined that there were two passages through the Polar Sea: one extending westward from Lancaster Sound, and the other, a serpentine complex of leads, lying along the Canadian-Alaskan coastline. Their eastern entrances were obscure, but both led into the Beaufort Sea. The Lancaster Sound, or northern, route was usually ice-choked. The opening to the southern passage was hidden behind the Boothia Peninsula and Somerset Island, which, being separated only by a narrow channel, amounted to a single, 300-mile-long archipelago jutting out from the mainland west of Hudson Bay.

The polar probe of 1818 was two-pronged. Franklin in the *Trent* and Commander David Buchan (the overall leader) in the *Dorothea* were directed to approach Greenland from the east, sail around the top (wherever that might be) of the great island and then proceed in a southwesterly direction looking for an entrance to the Polar Sea. This was an impossible assignment—as later explorations would prove—because of impenetrable ice. Fortunately the two ships got only to the Spitsbergen islands, where the *Dorothea,* stove in by storms, had to limp home with *Trent* as escort.

The other two ships sent out in 1818 were commanded by John Ross. They sailed into Lancaster Sound, but then retreated because Ross said he saw a mountain range lying ahead. On their return home, Ross' second in command, Lt. Edward Parry, contradicted his superior. He claimed Lancaster Sound was navigable for many miles to the west. Thus encouraged, in 1819 the Admiralty sent out two more parties. Parry sailed to Lancaster Sound and finding an open passage through the ice which in many seasons might have been closed, pushed far into Melville Sound, where he spent the winter locked in the ice pack.

The second expedition of 1819 was to travel from Great Slave Lake through unexplored lands to the Polar Sea. If and when they reached it, the party was to survey the coastline in an easterly direction. Command of the overland group was given to John Franklin. Ultimately it had some topographic success, but by common standards it was a messy operation. Crossing central Canada, Franklin's stiff-necked officer-gentleman manners infuriated those fur-company factors on whom he was logistically dependent. As a result, on arriving at the north shore of Great Slave, Franklin found only enough provisions for about two weeks. With Franklin was an orderly, John Hepburn;

On his 1821 expedition to Polar Sea, Franklin put canoes on sledges so dogs and men could haul them.

During an 1826 survey, Franklin's boats were almost destroyed by Eskimos, angry at being disturbed.

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Captain Leopold McClintock found expedition's remains in 1858 by looking exactly where Lady Jane always insisted her husband would have gone.

surgeon-naturalist John Richardson; two midshipmen, George Back and Robert Hood; and about 15 French-Canadian paddlers and porters.

In the summer of 1820—though he burned down his own tent trying to send smoke signals—Franklin made contact with a band of Copper Indians whose chief, a remarkable man named Akaitcho, showed up principally because he had heard rumors that Franklin was a shaman who could restore life to the dead. Franklin said he had no such powers but rather was an explorer. Akaitcho asked what exploring was and was answered with an oration about the pursuit of scientific knowledge and national glory. Then Franklin said he would like Akaitcho and his people to come along and forage for the party, adding lamely that he did not have any trade goods with which to pay the Indians.

Akaitcho responded that while he did not completely understand the purposes of exploring, it was clear this was very important to Franklin. Therefore, the sympathetic chief, through a translator, concluded: "If after all I have said [a warning that in the poor barren lands ahead his hunters probably could not supply such a large group well or for long], you are determined to go, some of my young men shall join the party, because it shall not be said that we permitted you to die alone. . . ."

Men followed him to the bitter end

It is an instructive incident. Throughout his career, Franklin was followed, willingly and faithfully, sometimes to the bitter end, by a mixed lot of men. One possible reason for this is suggested by the exchange with Akaitcho. People seemed to develop protective feelings toward this brave, mortally stubborn, straight-as-a-die fellow, perhaps because of, rather than despite, the fact that he was frequently a wrong-way-round and wrongheaded explorer.

Akaitcho was right about food. Weakened by hunger, the party traveled slowly. After wintering in some wretched huts, jerry-built at the edge of the tree line—the place was grandly called Fort Enterprise—they reached the Polar Sea at the mouth of the Coppermine River in mid-July of 1821, having taken nearly a year to journey from Great Slave. (Subsequent expeditions would accomplish this in six to eight weeks.)

At the Coppermine the weather worsened, the Indians turned back. The voyageur paddlers warned that neither they nor the canoes were strong enough to face the freezing northern seas. Franklin said that his orders were to explore eastward and put the canoes in the ocean. It was a fatal decision for ten of the men. For a month and some 500 tortuous miles they pad-

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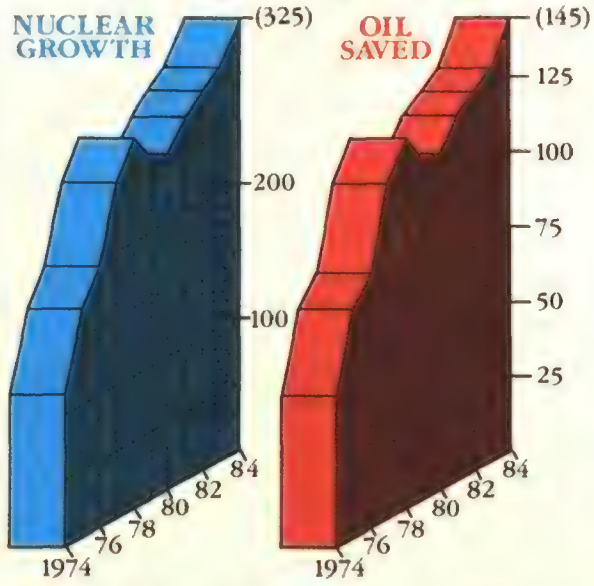

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Arctic Council that planned searches in 1851 included British explorers who gave their names to many of the world's icy seas and straits. From left: George Back, Edward Parry, Edward Bird, James Clark Ross, Francis Beaufort, John Barrow, Edward Sabine, William B. Hamilton, John Richardson, Frederick W. Beechey.

dled, fighting ferocious elements and the draining pangs of hunger. Finally the battered canoes had to be abandoned in Bathurst Inlet.

Having no other choice, the men started on foot back across the barren lands toward Fort Enterprise, 150 miles to the southwest. Without shelter from blizzards and frost, eating bits of found carrion, lichens, even their own moccasins, they began to die. Probably all would have done so had not George Back pushed ahead with the three strongest voyageurs looking for help. It was truly a heroic journey on improvised snowshoes across a wilderness already in the grip of winter. After a month, during which one of Back's men died, he found Akaitcho. The chief immediately sent a party of hunters with two sledges of meat looking for the survivors. At Fort Enterprise the rescuers found only Franklin, Richardson, Hepburn and one voyageur still alive. Richardson and Hepburn were still able to hobble on their frost-swollen legs, tending a small fire, boiling scraps of leather gear on it. Franklin was semiconscious, a day or two from death.

After recuperating, he returned to the Arctic in 1825, this time to descend the Mackenzie River and from its mouth to continue the coastal survey. On reaching the ocean, Richardson, again in the party, took boats eastward and during the summer, without incident, charted 900 miles of shoreline. In the same period Franklin made his way 350 miles westward, to Prudhoe Bay. Again he got into serious, but very avoidable, trouble—once allowing his boats to be dashed on a rocky headland, another time being very nearly rubbed out by a band of Eskimos (p. 122) whom he wished to observe at close range despite their obvious hostility. Only two men died on this venture.

Pluck often being regarded as a more admirable quality than brilliance, Franklin, after his overland expeditions, was greatly acclaimed in Britain. (It was said that he was pointed out on the streets of London as the celebrity "who had eaten his boots.") In truth, Franklin—or subordinates like Richardson and Back—first explored some 1,700 miles of Arctic shoreline. He had done it, though, at an enormous price, over

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Franklin's medal, a Cross of Hanover brought in by Eskimos in 1854, was first tangible sign of fate.

Relics found by McClintock near cairn on Point Victory included pill canisters, ointment, oiled silk.

routes so difficult they did not attract later travelers.

In objective retrospect, Franklin's career was marked by one debacle after the other. Some of his misadventures—being shipwrecked off Australia, the Battle of New Orleans, the aborted voyage of the *Trent*—were certainly not his fault, but nevertheless, trouble seemed to follow him. As an Arctic leader, Franklin lost more men, nearly 150 all told, than any other. Given the awful environment, some deaths may have been unavoidable, but many were due to Franklin's penchant for making bad decisions.

Despite his professional failings, Franklin's personal qualities deservedly brought him fame and make him memorable still. Among other things, and this is a paradox, he was lucky. If he had not been, considering the awful predicaments he was often in, his life would have been much shorter than it was. Also, few men have so personified the British bulldog virtues—courage and tenacity. Always, against all odds and sometimes reason, he pressed on, trying to do what he had been ordered to do—a man in whom determination had been raised to an almost transcendental level. In the end, however, determination killed him and, indirectly, prolonged and complicated the search for his party.

Before setting out in 1845, Franklin helped draw up his own orders. They were to sail westward out of Lancaster Sound and attempt to turn south, linking up with the Passage along the continental shore, some of which had already been charted by Franklin and other Hudson Bay explorers. If he could not find a southerly channel, he was to turn north and look for openings in that direction, advancing the work that Parry had begun. Based on surmise and the few notes found in the cairn on King William Island, it appears that in 1845 Franklin had again been lucky—though for the last time. Finding the way south blocked by ice, he took the *Erebus* up Wellington Channel to the north and—the sea being unusually open that year—circumnavigated Cornwallis Island, a feat nobody had accomplished before. He then wintered at Beechey Island, where Torrington and the two others died.

Heartbreakingly close to the great discovery

In the summer of 1846, still determined to carry out the Admiralty plan, he went south once more and, this time unluckily, found another freakishly open channel down Peel Sound, a narrow, rocky passage lying between the Boothia-Somerset archipelago and Prince of Wales Island. As winter approached and the ice began to accumulate, Franklin pressed on, as was his habit, to King William Island and came heartbreakingly close to making the great discovery. Had he turned, passed to the east of the island through Ross

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and Rae Straits, he would have been only a hundred miles or so from the eastern entrance to the coastal arm of the Northwest Passage. But either he could not go farther, or did not think of doing so. Rather, he stayed to the west of King William Island, and was caught by winter, dying in the pack ice that rolled in from Melville Sound.

After the big search for him began in 1848, several parties investigated the head of Peel Sound. But when they found it filled with ice, they reasoned that Franklin had done so too, reckoned it impassable and chosen to go another way. As a result all the official searches (and by 1858 as many as 35 British and American ships had combed those waters) concentrated in and above Lancaster and Melville Sounds. Lady Jane Franklin, perhaps because only she fully appreciated her husband's persistent devotion to duty, challenged this theory. She contended that if John had been ordered south, he would have sailed south, come heaven, hell or high ice. In her way she was as stubborn as he, and after ten years McClintock proved her right.

Thereafter a monument was erected in Westminster Abbey commemorating Franklin and his men for "completing the discovery of the Northwest Passage." Then and since, it has been argued that this inscription is a bit of a reach. Franklin himself died in 1847 on the icebound *Erebus*. Later Crozier or other survivors did indeed stumble across or along part of the Passage, but it is doubtful if they knew or—knowing—cared that they had done so. Even if they made the discovery, it would have remained unknown had not McClintock and others found their remains and interpreted the record of their bones. Would-be Franklin rescuers found both the southern and northern trans-Arctic passages, but nearly 60 years were to pass before anyone took a ship from the Atlantic to the Pacific, this being accomplished by Roald Amundsen in 1906.

All of which is in the nature of technical quibbling. The monument was raised in Westminster not to honor a great accomplishment but rather a great adventuring spirit. We continue to write and wonder about John Franklin for the same reason.

Erebus and *Terror* plunge on storm-tossed, iceberg-filled seas in a painting that shows not only influence of J. M. W. Turner, but Britain's sense of the danger and high drama of Arctic and Antarctic exploration.

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JAGUAR
A BLENDING OF ART AND MACHINE

By Jake Page

A special camera lets viewers fly with the shuttle

Astronauts turned cameramen now provide closest thing to being there in The Dream is Alive, *opening at Air and Space Museum*

Floating effortlessly against the backdrop of the Earth, astronauts work in payload bay last October.

The sense is immediate and immense. You are screaming down to an airport . . . no, it's the Kennedy Space Center, the brown earth heading right at you awfully fast. Someone says the loud noise you just heard was a sonic boom. Then the familar voice comes, the voice by which millions of Americans shared in Man's reach for the moon. Walter Cronkite explains that this ends the three-million-mile journey of the space shuttle.

The palpable and slightly alarming notion that you are *in* the shuttle as it lands is the result of special cinematic effects, chief among them the 50-by-75-foot screen that envelops you and the work of a vast and cumbersome camera the astronauts came to think of as a kind of fellow passenger, a pet named Max.

Reviewing the footage of this film last year, Bob Crippen, commander of two of the three shuttle flights during which the film was shot, said: "This is the closest thing to being there that I've ever seen." "There," of course, is in outer space, in orbit around the Earth.

The 36-minute film, which premieres this month in the National Air and Space Museum's Samuel P. Langley Theater and will be seen in about 40 other IMAX and OMNIMAX theaters around the world in coming months, is called *The Dream is Alive*, and, thanks to the fact that a number of astronauts were happy to double as film crew, the dream that is shared by so many of us normally Earthbound folk—the dream of space flight—is not only alive but ours.

Obviously this was no ordinary filmmaking event. First, the camera. On Earth, Max weighs about 80 pounds. Each frame is nearly three-by-two inches and as sharp as anything taken by most still cameras. Approximately 1,000 feet of film race past the lens in three minutes. The frame size accounts for the preternatural sharpness of the picture on the screen, IMAX meaning "maximum image." The camera was developed by Graeme Ferguson and his associates in the Canadian firm Imax Systems Corporation for use in such blockbusters as *To Fly* which gives viewers an unparalleled sense of vista. And the greatest vista is space.

The IMAX camera was perfect for space, but it awaited the creation of a big enough spacecraft: the shuttle. Extraordinary arrangements were needed to allow a single organization to make a film in space. NASM was picked since it so clearly represents the U.S. spirit. With the space agency's cooperation and financial aid from the Lockheed Corporation, Ferguson went to work on the museum's behalf.

The large and complex camera had to be modified for use on the shuttle, where every inch of space is precious, every pound a matter of concern. Among the modifications was the use of common garden-variety Velcro: in the weightlessness of space, the camera could simply be stuck to the wall, out of the way, or affixed

Kathy Sullivan is at left; David Leestma wears red stripes for easier identification by crew members.

Other hands offer help as astronaut Brewster Shaw tries camera while weightless on a training flight.

to a port while it recorded the Earth spinning by below or astronauts working outside the spacecraft.

Next, astronauts had to be trained in the camera's use—not just as camera operators but as film directors. Ferguson, who produced and directed the film, sent a team to Houston and for ten months they camped out, ready at a moment's notice to fill in an astronaut's "down time" when something else in the training schedule was canceled. The astronauts spent nearly a year rehearsing, often practicing underwater to approximate doing a task in a weightless environment.

Would the camera itself function in space? Technicians under the watchful eye of engineer Bill Shaw and producer Ferguson took Max aboard a KC135, a plane that curves upward and, in the course of turning to head back to Earth, provides 25 seconds of zero gravity (above). The camera, at one moment an 80-pounder, at the next weightless and seconds later twice its weight, worked fine.

Thus did Max become a presence on board three shuttle flights in 1984: 41-C in April, which included the dramatic capture, repair and deployment of the crippled Solar Max satellite; 41-D in August-September, which successfully tested a 100-foot-high solar array developed by Lockheed; and 41-G in October, which featured the first spacewalk by an American woman, Kathy Sullivan. These spectacular events are all shared, thanks to Max and the astronauts, along with the intimate sense of activity and weightlessness within the spacecraft.

We watch an astronaut preparing for an EVA, an extravehicular activity. She gets aid from a floating colleague in donning her "upper torso assembly," which means her vest. We watch the ghostscape of sleep (pp. 136-37), astronauts secured by covers, their arms floating in front of them, the natural position dictated by musculature uninfluenced by gravity.

In addition to the interior shots, the IMAX camera provides large-screen views of launches seldom seen before. In one, the camera was set up about 300 feet from the launch pad. In another, the camera was affixed to the tower: the shuttle rises on a vast eruption of flame and passes upward (p. 134). Microphones pick up the sound of a shuttle gliding in for a landing—like the sound of a gigantic locomotive, remarks Graeme Ferguson—as well as the ambient sounds of life aboard the orbiting craft as never before heard.

Free-lance writer Jake Page doubles as an editorial consultant to the National Air and Space Museum.

Like visitors from another galaxy, spacewalkers Sullivan and Leestma peek in the shuttle's windows.

An IMAX camera at the 225-foot level of tower captures the drama of a lift-off last January.

Pilot Jon McBride helps Leestma put on the special garment that will keep him cool during spacewalk.

In so spectacular and, in a certain way, disorienting an experience, it is difficult to pick out the *most* spectacular, but inevitably a candidate is the footage shot of the Earth below, the brilliant crisp arc of sunrise—seen 16 times a day from the shuttle—and the dreamy landscape of the planet revolving 200 miles below the shuttle's ports, the vista of all vistas.

At one point, reviewing the rushes, Commander Crippen remarked: "Now this is the Persian Gulf and there's an oil depot we're just passing over here on the right. . . . You can also see the oil fires from the little conflicts they're having over there."

Little conflicts? This was no trivialization of human suffering. Instead, it reminds us of the perspective of space that lets us see our planet as a fragile thing; the perspective that suggests that the quarrelsomeness of men and nations—all invisible and boundaryless from orbit—may one day be seen by all mankind as a terrible waste of human creativity. *The Dream is Alive* lets us all, however briefly, share that vision and in this, perhaps, lies its supernal glory.

A ten-ton satellite carrying 57 experiments for 200 scientists from eight countries is released. It will be retrieved on a later shuttle flight.

On board Discovery, Max the camera and his operator keep watch as the other astronauts, weightless arms afloat, catch up on their sleep.

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Fellow of the Royal Society, author, mother of six, world-renowned expert on the flea, Miriam Rothschild confronts life at a spirited 76, awash in scientific projects and shelties.

By David McCullough

A Rothschild who is known as the Queen of the fleas

But at Ashton Wold, far from London, she also reigns over plants, dogs, owls and rabbits

Miriam Rothschild knows all about butterflies and fleas, birds, fish and poisons, ladybugs ("my real first love"), medieval meadow grasses, Shetland sheep dogs, photography, farming, Clark Gable and the wild flowers of Israel. She designs her own clothes. She has an art gallery devoted to paintings by schizophrenics. She owns a pub. She has raised six children and she is one of *the* Rothschilds.

Of her eccentric Uncle Walter, her favorite Rothschild, who was an outstanding British naturalist, she has written a lively biography, *Dear Lord Rothschild.* About fleas, her own specialty, she has written possibly a quarter of a million words in books and learned papers. A single cupboard at Ashton Wold, her country estate, contains 60,000 microscopic preparations of fleas. But this, she insists, is nothing much at all compared with Uncle Walter's operations.

"Imagine," she says, "two and a quarter million butterflies, 30,000 bird skins, 300,000 beetles and 144 giant tortoises!" Imagine, indeed.

In a framed photograph on her bookcase Uncle Walter, in top hat and high-button shoes, sits astride a live giant tortoise, urging it forward with a bit of lettuce on the end of his walking stick. "That," she explains, "was Rotumah, the famous giant tortoise that died of sexual

Color photographs by Michael Freeman

This dazzling drawerful of swallowtail butterflies is a portion of 2.25 million collected by Miriam's Uncle Walter and given to the British Museum.

overexcitation. Walter found that tortoise in the garden of a lunatic asylum in Sydney." Rotumah was 150 years old, the oldest, largest tortoise in the world, so Walter brought it to England. "And he got the doctor from the asylum to travel with it. That's the best thing of all!"

She sometimes acts as though she is having too much fun with too many interests ever to be taken seriously. But she is a scientist of the first rank. Her work on fleas, her butterfly studies and her encouragement of other scientists have brought her all sorts of awards and honors. In the citation for an honorary degree from Oxford (1968), she was lauded for contributions to anatomy, chemistry, entomology, pharmacology, neurophysiology and zoology. "It is unusual too [the citation continued] that in natural science anyone, still less a woman, should receive an honorary degree without any degree already from any university." Just this year, she was made a Fellow of the Royal Society, the highest honor in British science. Yet Miriam Rothschild had little academic training of any kind —her family believed it would stifle the joy of learning.

"Brilliant is not an inappropriate word for her," says Robert Traub, a professor of microbiology at the University of Maryland Medical School, with whom she has collaborated on two books and several papers. "People talk about genius and use the term loosely, but this is really it."

Miriam Rothschild will be 77 in August. Her latest project is with wild flowers, and seen surveying one of her experimental meadows, she makes a memorable figure. Short, sturdy, rather heavyset, she goes clomping along in large green rubber boots, gray hair tied back in a blue scarf, trailed nearly always by one or more of seven Shetland sheep dogs. Her uniform is a comfortable, loose-fitting dress and matching jacket she contrived herself and had made up in several colors. It is all she ever wears. "I've got a very great deal that I have to do," she will tell you. "It's important to cut out the trivialities."

She needs no more than four hours' sleep. She keeps a suitcase packed at all times (to avoid the fuss of packing for her frequent trips), and she has forsworn city life. "I appreciate museums. I have to go to libraries in London, but in the city it takes such a lot of energy to cut out the things you *don't* want to hear and you *don't* want to see." Besides, she contends, "all the big dramas" happen in the country.

She lives year-round at Ashton Wold, in strange, overgrown English country splendor, a two hours' drive north of London in Northamptonshire. Deep woods enclose much of the property. Overhanging trees and shrubs brush the sides of your car as you approach. The weeds grow nearly knee-high in the gravel courtyard.

Historian David McCullough met Miriam Rothschild while filming TV interview for Smithsonian World.

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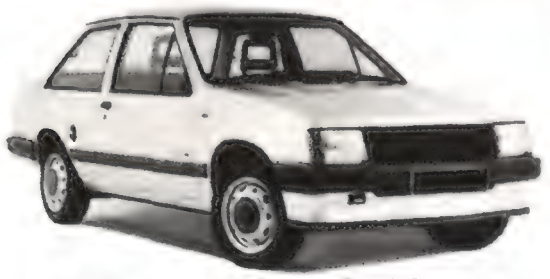

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Edwardian equipage, including zebras which Walter trained himself, used to take him for conspicuous spins around Hyde Park.

The grass goes uncut. Vines and creepers run wild over half the house, a big, sprawling, gray stone affair built by her father in 1900. It is where she was born and it looks abandoned, or as though the Rothschilds have fallen on hard times, if such a thing can be imagined—a look exactly to her taste. "Very attractive," she says, as if nothing more need be explained.

Her father was Charles Rothschild, a gifted amateur entomologist who, on a trip to Egypt before she was born, discovered the rat flea, the one that carries bubonic plague. At the time the rat flea was a new species and her father named it *Xenopsylla cheopis*. Charles and his older brother Walter were the sons of Nathan Mayer, or "Natty" Rothschild, head of the great merchant banking firm of N. M. Rothschild & Sons and the first Lord Rothschild. An earlier Nathan Mayer, Miriam's great-great-grandfather, the first of the English Rothschilds, had arrived from Frankfurt am Main in the middle of the 18th century and established himself as a cloth merchant in Manchester. Nathan Mayer, as he said, was all business. In 15 years, having switched to banking in London, he was helping finance Wellington's armies.

After him came Lionel Rothschild, great friend of Disraeli, who made history by financing Britain's purchase of the Suez Canal in 1875. But it is Lionel's son, Natty (1840-1915), described by Miriam as gruff, sentimental and dapper, who ranks as one of the most brilliant financiers of all time. In the popular press he was considered the real ruler of England, and was the first Jew to take a seat in the House of Lords.

Though Natty's two sons, Walter and Charles, each conscientiously took part at N. M. Rothschild & Sons, neither cared a thing for banking. At the ripe age of seven, Walter announced he was going "to make a museum" and spent the better part of his life pursuing that ambition. In time his collection exceeded that of any private individual anywhere, ever. Housed in the Rothschild estate called Tring, it is now part of the British Museum.

Charles, though he was a far better banker, preferred science to finance, specializing in fleas and butterflies. It was on a butterfly hunt as a student that he first fancied a portion of wild countryside near the village of Ashton, where the house now stands, and concluded he must have it. On inquiry he learned that it already belonged to his own father.

Miriam's memory of Charles is limited. He was ill through much of her

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childhood, and in 1923, when she was 15, he took his own life. It was thus that Uncle Walter, the second Lord Rothschild, who had no children, became such a large part of her world.

Walter is assured a place in history because he is the Lord Rothschild to whom Arthur James Balfour, the British Foreign Secretary, addressed the famous Balfour Declaration of 1917, saying His Majesty's Government viewed with favor the establishment of a national home for the Jews in Palestine. It was written in the form of a letter beginning "Dear Lord Rothschild," the title Miriam chose for her book.

Two things distinguished Walter as a naturalist, she says—unbounded enthusiasm about every conceivable kind of living creature, and near total recall of everything he ever saw, heard, read or wrote. "He remembered every letter he'd ever written. Never kept copies of them." To be sure, he also had financial resources beyond most people's imagining. Still, Walter's reach often exceeded even the Rothschild grasp. He was constantly short of money or in debt. At times he had 400 people on his payroll collecting specimens all around the world.

His eccentricities were legendary. As an M.P. he once caused a sensation

At microscope in her bedroom, she prepares data for book on insect tissue.

In greenhouse she greets young "friend" engaged in a breeding experiment.

in the House of Commons by showing up in a white top hat. ("And I mean today," Miriam says delightedly, "that would be equivalent to, say, Mr. Reagan appearing in punk!") On other occasions, he drove down to Hyde Park with his coach drawn by a team of zebras. Because of a lifelong speech impediment—an almost crippling lack of breath control—he found normal conversation impossible. "You never knew what was going to happen," she remembers. "Either the words came out in a bellow, which absolutely raised the rafters, or else it was a whisper. He was always embarrassed, and you were always embarrassed, and then silence fell."

But Walter was a born naturalist, and naturalists, she is sure, are born, not made. She herself began breeding ladybugs at the age of four and remembers taking a tame quail to bed with her. "I just always loved animals and I was passionately fond of flowers. That's the sort of thread that's gone through my whole life." She learned from her parents, from Walter, and from years of living at Tring with Walter's collections.

"Collections are basic to zoology," she stresses, recalling drawer after drawer of his butterflies. Walter had made butterflies his entomological passion beginning in 1895, having said good-bye to beetles, as she writes

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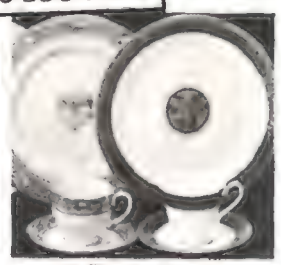

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in her biography. The way other wealthy Victorians collected Chinese porcelains or rare gems, Walter amassed butterflies, the rarer the better. The result was surpassing, perhaps the most valuable butterfly collection in existence. It was possible to open drawers and see spread before you an entire order in all its variety and from every quarter of the globe. "The mind just took off," she remembers.

Her own earliest, serious work, starting in her 20s, was in marine biology. After her marriage, she concentrated on flea studies, partly because it was work she could carry on at home. With children to raise, her microscope became her escape, her marijuana, as she says.

"I had six children, so it was quite, you know, a full-time job. But at about 8 o'clock in the evening, when they had all gone to bed, I used to settle down to the microscope, and there was nothing more delightful—when the evening would get quieter and quieter and even the sort of clink of cups vanished, and you could settle down and look at these marvelous colors. You could forget the world, and in fact, I used to be brought back to Earth by falling into the microscope with sleep at about 1 o'clock."

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She catalogued her father's flea collection, from which she published a five-volume study. In time she became the world's leading authority on bird fleas. With the appearance of *Fleas, Flukes & Cuckoos*, her sprightly book for the lay reader published in 1952, she became known as the "Queen of the Fleas." What fascinated her especially was the acute dependence displayed by fleas and parasites, and the degree to which they gave evidence of their evolution. Her style was altogether her own:

"A parasite's life is an impressive gamble," begins one chapter. "Indeed it is difficult to envisage insecurity on such a scale. The chances of a grouse roundworm finding a grouse are far less than the reader's chances of becoming the parent of quads, or a cabinet minister."

With her son-in-law as photographer, she was the first to record the flea's leap, one of the miracles of nature. ("If you were a flea," she informed me, "you could jump to the height of Rockefeller Center and you could do that about 30,000 times without stopping.") Her most important research, however, concerned the rabbit flea, carrier of a viral disease fatal to rabbits called myxomatosis. She discovered that, unlike any other insect parasite, the rabbit flea has a reproductive cycle dependent on the hormonal state of its host. The female rabbit flea can produce offspring only while living on a pregnant female rabbit, the flea drawing on the rabbit's estrogen supply. The flea larvae are also then in place to feed on debris in the rabbit nest.

In addition to fleas, she worked on mites and ticks (which are large mites), and a large brown, gull-like bird called a skua, which spends most of its life at sea and gets most of its food by piracy, attacking other seabirds until they drop their catch. Research on butterflies and moths led to discoveries about the relationships between insects and plants, and particularly on the use of plant poisons by insects as a defense mechanism. Working with Tadeus Reichstein, who with two others won a Nobel Prize in 1950 for his isolation of the hormone cortisone, she reported how the monarch butterfly protects itself by storing within itself poisons drawn from the milkweed plant—poisons to which the monarch has evolved an immunity—making it quite unpalatable to birds and spiders.

More recently she discovered that her beloved ladybugs—or ladybirds, as she calls them—are also extremely poisonous. A single ladybug egg, she found, can kill a cat if injected into the bloodstream. "Just one egg!" she says, her face filled with wonder.

At present she is working with caterpillars, allowing them to feed on castor-oil plants and other euphorbias with extraordinarily toxic seeds, which the caterpillars use as protection from bird predators. She grows about a half-dozen such plants in the old, rather worse-for-wear greenhouses of the estate. There are worktables covered with plastic sandwich bags filled with seeds so poisonous they can't be touched. There are

Miriam Rothschild

Of microscope views like this she says "They're my marijuana."

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tables filled with seedling wild-flower plants, a cage with a veteran white rabbit from her days of rabbit-flea work, a pet magpie that she has raised by hand safe from exposure to hornets, in preparation for the day when a hornet with its stinger removed could be put into the cage.

The idea was to determine how much of a bird's fear of hornets is inherited, how much learned from experience. If the bird were to eat the hornet, then obviously the fear was learned, which is what Miriam expected and what did not happen. She was flabbergasted, she admits, when the bird refused to go near the hornet.

She has just completed a book on insect tissues and with entomologist Traub she is producing still another flea study, this on the discovery in Utah of a flea of Latin American origin called a chigoe that burrows into the ear of a mouse and grows to the size of a pea. Until recently none was known in North America.

But wild flowers are her main preoccupation, her experimental gardens and meadows her greatest pleasure.

Miriam at 16 in 1924. Her family thought school might stifle her joy in learning.

Uncle Walter rides Rotumah, dangling lettuce to lure the great tortoise on.

In the eyes of any conventional farmer she is busy growing weeds—wild poppies, cowslip, cornflowers, corn marigolds, harebell, wild violets—and harvesting their seeds as a cash crop, an enterprise local farmers once took to mean she was "absolutely crackers."

Wild flowers are rapidly disappearing from the countryside, she stresses, and the loss is not just one of beauty. "You're losing the gene pool and that's something that, once gone, you can never get back. That's millions of years of evolution down the drain." Creating nature reserves as a means of protection (the scheme favored by her father) is no longer enough. Instead, she wants to reintroduce wild flowers everywhere possible—along highways, rivers, in parks, backyards, vacant city lots. She had been told that to re-create a medieval meadow —a wild hayfield with approximately the variety of grasses and flowers common to medieval England—would take about seven years. She has done it in three, re-creating a meadow containing 100 species.

"I think the flowering meadows are going to come back. They're finished now. We just have these terrible monotonous crops of dull green grass. I mean it, it is so boring. I don't know

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Remarkable range of specimens makes up Rothschild family collection at Tring; it is now officially a part of the British Museum.

how the horses can stand the stuff."

While machines can be used for harvesting some of her wild-flower crop, most of it must be done by hand. It is slow, unusually tedious work, and consequently many of the seeds are extremely expensive. Two pounds of harebell seed, for example, sell for £900, about $1,080 at the current exchange rate. But her work has stimulated enormous public interest, and harebell, as it happens, is the seed second in demand after cowslip. In time, she hopes to market more varieties, including wild flowers mentioned in the Bible.

Beyond her gardens and experimental meadows and the encroaching woods she loves as her father did, the estate opens out into broad wheatfields, rich flat land almost like prairie that seems to go on indefinitely. The one interruption is the tiny village of Ashton, which includes the pub and art gallery. The thatched-roof pub is the Checkered Skipper, named for a rare butterfly. By her direction, the decor is all natural history exhibits, making it a pub like none other in England. The gallery includes only paintings by schizophrenics—strange, intense works, many of amazing skill and nearly all dominated by images of large, threatening eyes. The paintings are part of a collection she had assembled with an art therapist, Edward Adamson. None of it is for sale, nor is there another collection comparable to it. (Schizophrenia is an "old interest." To help understand and treat schizophrenics, she and her family founded the Schizophrenia Research Fund in London.)

At one time, during the Second World War, there were 6,000 Americans billeted in and about Ashton, and there are always a few who come back to visit every year. They were part of the Eighth Air Force. The Rothschild wheatfields were once Polebrook Field, Miriam's house was their base hospital. She remembers well the intense excitement when the American B-17 Flying Fortress bombers first arrived from the United States. No one had seen planes that flew so high or that left vapor trails.

Of the American airmen, she says, "I thought they were absolutely tremendous . . . they won the war for us, no doubt about it." One of those she got to know best was Clark Gable, then an Air Force major, whom she delights in talking about, telling what a crack shot he was (they often went shooting together in the evenings, he at rooks, she at targets), and how he had almost no sense of humor.

More than 300 missions over Germany were flown from her now tranquil fields. One colossal hangar still standing is used to store potatoes.

"You know I was the first person to install seat belts in a motorcar," she told me as we drove out to see the site of the old airfield. "It was in 1940, when the first American aviators arrived in civilian clothes, even before you got into the war. I saw the safety belts they had in their training planes and I said we ought to have those in motorcars." Using a girth from an old sidesaddle, she made up seat belts for her car and tried without success to have the idea patented.

It was during the war that she met and married a British commando and war hero named George Lane, a marriage that was dissolved in 1957 though he is still a good friend. To many of her scientific colleagues it also seemed that she did remarkably little with her mind all that time, little at all of consequence, which was puzzling largely because it was so out of character. Nor did she offer an explanation. Only long afterward did it become known that she had been involved with the famous Enigma project, working with the top-secret group at Bletchley Park, trying to crack the German code. Scientists from many fields were enlisted and marine biologists were known to be particularly good at such work. She got a medal from the British Government for her part, yet still won't say anything about what she did.

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"I never hated anything as much as I hated the war," she told me, talking of the airmen who did not come back. "It's impossible to describe it. You know, for years afterward when I woke up in the morning, my first thought was, well, thank God the war's over."

Her conventional farming enterprises are large-scale and serious business. "I *am* a farmer," she says emphatically. And indeed it is the farming that has supported her and all her scientific researches year after year. But farming, as she puts it, is "an old story" in the family. Grandfather Natty was an avid breeder of shire horses, president of the Jersey Cattle Society and active in developing new agricultural practices. The farms at Tring, where she spent so much of her youth, were showplaces and a favorite stop for visitors from all over the world.

Where Walter Rothschild found talk difficult, Miriam thrives on it. She is, in addition to everything else, one of God's great talkers and never more so than when she reflects on the changes that have come to our relations with the natural world.

"Somehow people have lost the sense of being in a landscape. There are no more figures in a landscape like there used to be. I tell my children they're like Sputniks spinning in space with a sort of speedy background swooshing by. You just see the figure, the landscape is gone."

I asked her if her recipe for life is different now from what it was 25 years ago.

"No, not at all. If I had to wish one wish for my children, I would wish that they were interested in natural history, because I think there you get a spiritual well-being that you can get no other way, and what is more, life can never be long enough. . . . I think all naturalists retain a sort of keen interest in what's going on in life. It's all part of natural history. I mean Karl Jordan, curator at the Tring Museum, was 96 and he was just as enthusiastic as he was at 19 and I always remember him sitting at the microscope saying, 'I shall know it all in the next world, I shall know it all in the next world!' "

She was settled on the couch in her study, one of her dogs curled up beside her, the picture of Uncle Walter on the tortoise displayed directly behind her.

"I must say," she said, "I find everything interesting."

Eyes protected by goggles, Miriam greets Pamela, her favorite tawny owl. Partly because night vision helps them detect poisonous moths, birds are useful in "insect sorting."

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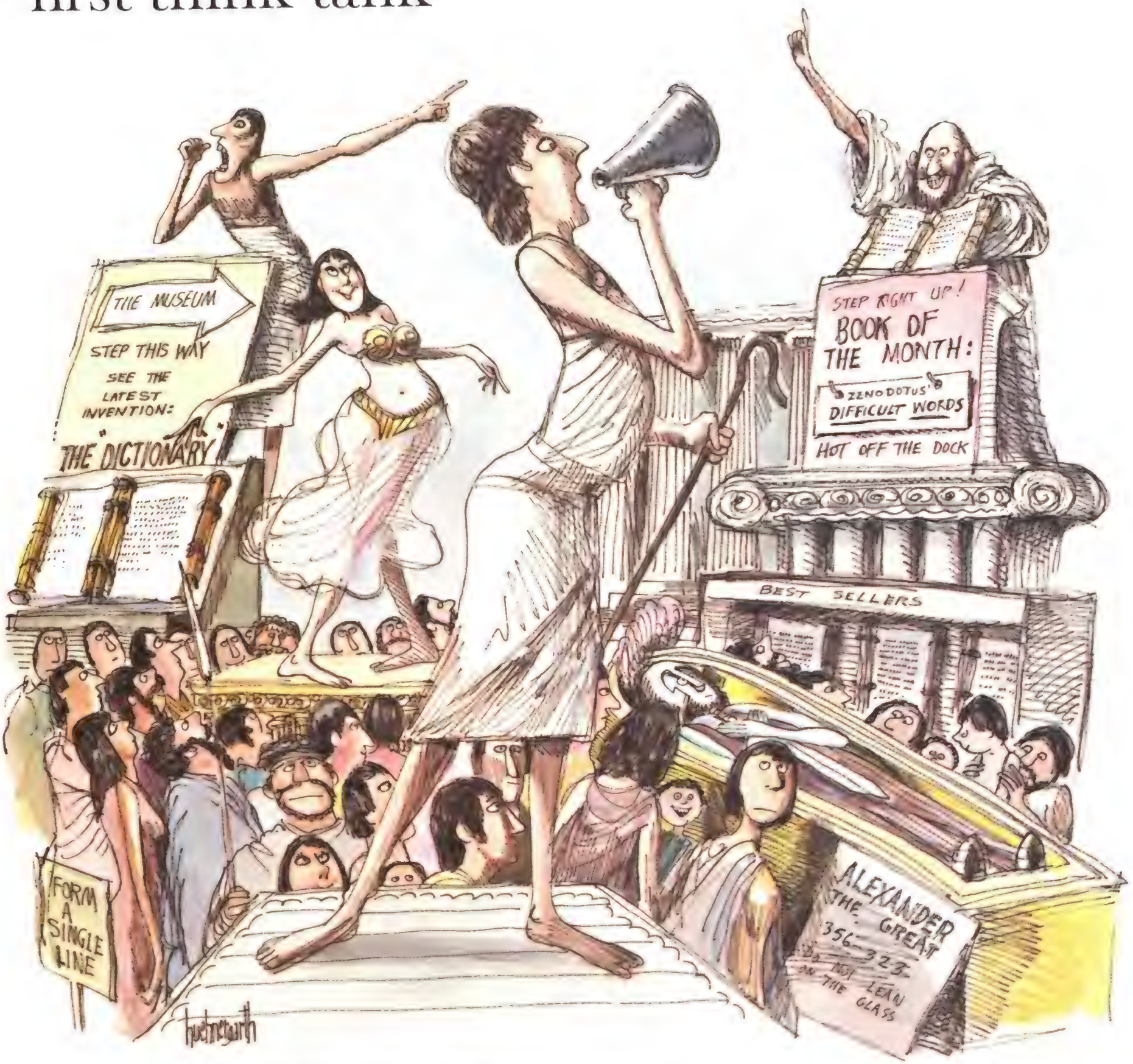
By Lionel Casson

Triumphs from the ancient world's first think tank

In Egypt the Ptolemies created a giant library, giving rise to all sorts of new ways to organize and retrieve information



Literary stars of the ancient world were lured to Alexandria while hired architects built a "Place of the Muses"—or museum. But it was Alexander the Great's corpse that made the city a tourist attraction.

When Pericles and Sophocles were in school in Athens they had the same trouble reading Homer as modern schoolboys do reading Shakespeare. The *Iliad* and *Odyssey*, written some 300 years before their time, were full of old-fashioned expressions and obsolete words. We turn to a dictionary for enlightenment. They could not: there *was* no such thing. And would not be for two more centuries, not until after 300 B.C. when scholars, slaving away in far-off Alexandria, took the first steps toward composing one.

Invention brings to mind the wheel, the cotton gin, the steam engine, the telegraph. But the dictionary had to be invented too, as well as the encyclopedia, the textbook, even the grammar book. These tools of learning are so much a part of life today that it is hard to imagine a time when they did not exist. But there was—a long time: Thucydides wrote the *History of the Peloponnesian War*, Sophocles wrote *Oedipus*, Euripides *Medea*, Plato his dialogues, without these simple devices for storing and retrieving information.

For schoolboy Pericles and schoolboy Sophocles homework did not consist of doing term papers or anything else that involved research. It meant memorizing passages from the great books—the epics of Homer and Hesiod, the odes of Pindar, the tragedies of Aeschylus. Research, to be sure, existed—Thucydides could hardly have written his history without it—but it depended upon the collecting of notes and a well-developed memory, not on a shelf full of reference works.

Then, around 300 B.C., a remarkable institution came into being, the great library and museum at Alexandria. It was the world's first think tank.

With a little help from Plato and Aristotle

Before that, of course, the situation had begun to change. During the fourth century B.C., with help from Plato and Aristotle, philosophy became the Greeks' dominant interest. Aristotle's philosophical enquiries involved carefully observing and recording nature; he himself wrote treatises on biology and zoology, and his favorite pupil, Theophrastus, turned out treatises on botany. Soon the doors of scholarship were thrown wide open and Greeks busied themselves amassing facts of all sorts.

When Alexander the Great died at Babylon in 323 B.C., one of his generals, the canny Ptolemy, promptly took over as king of Egypt, a land where the fertile Nile valley ensured a full treasury. Much of it was spent by Ptolemy and his successors on embellishing the capital at Alexandria.

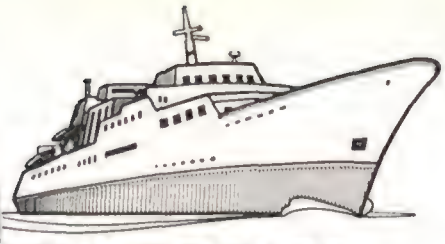
Having somehow got his hands on Alexander's corpse (there were those who claimed he stole it as it was being shipped back to Macedonia for burial), Ptolemy had it encased in a gold coffin. Eventually it was enshrined in a handsome mausoleum, creating a sort of Alexander Memorial that guaranteed the city's future as a tourist attraction. Planners laid out a grid-iron of streets with two huge boulevards, architects designed palaces, sculptors chiseled monuments. But a great city has to satisfy the mind as well as the eye, so the Ptolemies set about luring the intellectual luminaries of the age to Alexandria—not only poets and dramatists but philosophers, scientists, mathematicians, doctors, men of letters.

Wits sneered at museum scholars as "bookworms who scratch in the chicken coop of the Muses."

As inducement, Alexandria's museum, literally her "Place of the Muses," was founded. It was not at all a museum in the modern sense but rather a complex where scholars could carry on varied pursuits in ideal circumstances. It had a dining hall in which they took their meals in common, private studies, laboratories, a cloisterlike promenade for thoughtful strolling, and so forth, all funded by a generous endowment from the crown. The members may have been, as a contemporary wit sneered, "bookworms who scratch in the chicken coop of the Muses," but, as it turned out, they produced remarkable results justifying every drachma spent on them.

The greatest resource of learning for the museum was a general reference library—and that in itself was something dramatically new. Up to then what few

Illustrations by John Huehnergarth



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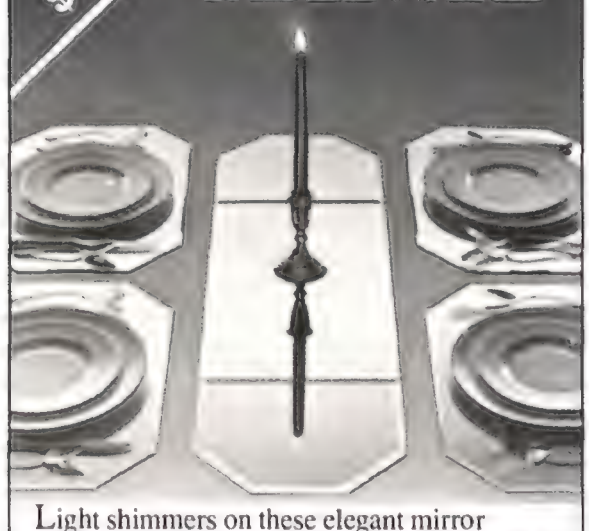

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libraries existed had been private, put together by wealthy individuals with scholarly or literary tastes; the money was all-important because in those days books, each handwritten on vellum or paper made from the reeds of the papyrus plant, were very expensive items. Aristotle, tutor to the young Alexander the Great, for example, had a famed library. But what Ptolemy and his successors built up at Alexandria was a library as we conceive of a library today—an organization with an administrative staff headed by a chief librarian that acquired books on all subjects for the use of all qualified readers.

Though the collection had to start from scratch, successive Ptolemies swiftly acquired books the way Ptolemy I had acquired the corpse of Alexander—highhandedly. Whenever someone landed at Alexandria with books in his luggage, the royal agents checked them over, picked what they wanted and carted them off to the library. There they were copied and the copies handed back to the owners, while the precious originals went on the shelves with a special indication, "from shipboard." Ptolemy III arranged to borrow from Athens the official copies of the tragedies of Aeschylus, Sophocles and Euripides. The Athenian authorities made him guarantee safe return by putting up a deposit of 15 talents—the equivalent today of more than four million dollars. It didn't help: as with the books "from shipboard," he held the originals and sent back the copies, cheerfully forfeiting his money.

Around 200 B.C., the king of Pergamum in northwestern Asia Minor also established a library, and this raised the tempo of the hunt for acquisitions. Soon both Pergamum and Alexandria were chasing after rare books as hard as art dealers chase after Old Masters today. The family

A professor of classics, Lionel Casson writes frequently for SMITHSONIAN. *He is at work on a book about Rome's maritime trade with the Far East.*

About 200 B.C. the kings of Pergamum and Egypt began to vie for manuscripts.

that had inherited Aristotle's collec tion lived in a town subject to Per gamum; they hid all the volume they had in an underground trench rather than see them fall into the king's clutches.

Eventually, with a little help from history, the two rival libraries came together. In 48 B.C. Julius Caesar landed at Alexandria, mixed into politics (on behalf of the charming young Cleopatra), was attacked by a coalition of her opponents, and in the fighting that followed many o the library's holdings were destroyed A decade or so later Marc Antony had his turn with Cleopatra. The Egyptian queen was not only a fas cinating woman but a learned one able to speak half a dozen language and with a keen interest in science and literature. As triumvir in charge of the eastern part of the Roman world, Antony's sphere of command included Pergamum. Gallantly he helped make up for Egypt's literary loss by presenting Cleopatra with al the books that were taken from the Pergamum library.

The creation of the library at Alex andria by Ptolemy and his heir meant that scholars had at their dis posal, in one place, the spread o books from which to cull both words for a dictionary and facts for an en

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cyclopedia. But there was a necessary preliminary step: since no such thing as a reference library had ever existed, library science had to be invented, as well as some system for organizing books and cataloguing them. This was accomplished by the first appointee as chief librarian, Zenodotus of Ephesus, who held the post until about 270 B.C.

Zenodotus was a scholar who became a librarian only by force of circumstance. His celebrated teacher, Philitas, had produced a work titled *Miscellaneous Difficult Words,* in which he discussed a conglomeration of dialectical expressions, technical jargon and obsolete terms. Zenodotus was particularly interested in the *Iliad* and the *Odyssey,* the two works most cherished by the ancient Greeks. Taking his cue from Philitas he wrote a book called *Difficult Words,* in which he discussed rare or obscure words in Homer. But, departing from his teacher's model, he introduced something new: he put the words he treated in alphabetical order!

The next step forward was taken by a pupil of Zenodotus', Aristophanes of Byzantium, who served as chief librarian from about 200 to 185 B.C. Aristophanes cast the net even wider: in a compendious work called *Words,* he treated not only obsolete and obscure terms in poetry but difficult words from prose works—and from writers of all periods, not just Homer and others of long ago.

Aristophanes thus became the real father of lexicography. Later workers in the field simply delved deeper into specific areas. Didymus, for example, who lived in Alexandria toward the end of the first century B.C. and whose capacity for backbreaking research and writing—according to different sources he was the author of either 3,500 or 4,000 works—earned him the nickname of Bronze-Guts, compiled a *Words in Tragedy* that was longer than the *Iliad.* Another hard worker, Artemidorus, drew up a *Glossary of Cooking Terms.* It was not a cookbook—that had been invented back in the fifth century B.C. in Sicily (when it came to food, the Sicilians were the French of the ancient world)—but a listing, with explanation, of unfamiliar cooking terms such as the names of popular regional dishes.

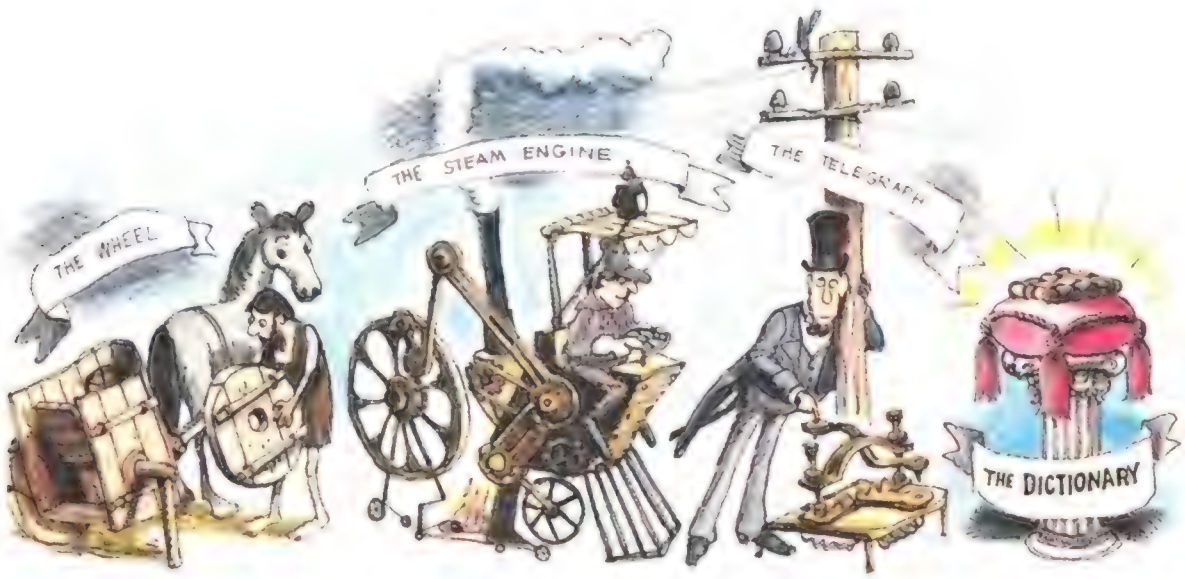
Philitas' *Miscellaneous Difficult Words,* Zenodotus' *Difficult Words* in Homer, Aristophanes' *Words,* Bronze-Guts' *Words in Tragedy,* Artemidorus' *Glossary of Cooking Terms,* have none of them survived. They are known to us, though, in the form of quotations from them—or references to them—in the writings of later scholars, which provide a good idea

Tourists arriving in Alexandria had their books carted off to the library.

of what they were like. Artemidorus' *Glossary of Cooking Terms,* for example, in discussing an obscure regional dish called *myma,* defines it as consisting of "meat and blood, with the addition of numerous condiments"—a clipped, succinct definition just as in a dictionary today. (The commentator who quotes it, writing at about the turn of the second century A.D., adds what a proper cookbook said about the dish, and this indicates that ancient cookbooks, too, weren't all that different from today's: "Let the meat include organs and intestines and be chopped fine; add as condiments vinegar, toasted cheese, cumin, fresh and dried thyme, fresh and dried coriander, two kinds of onion of which one is to be roasted, poppy-head or raisins or honey, seeds of an acid pomegranate; fish may be substituted for meat.")

This entry from a considerably later glossary based on the work of the Alexandrian lexicographers also illustrates the procedure that most of them used:

"*Melogion,* a Scythian beverage. See Glaucus, Description of Places Lying toward the Left of the Pontus [Black Sea], Book I: 'When the drivers agreed, he dismissed the assembly. They dispersed, each to his own



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home, and prepared the *melogion.* This drink is more intoxicating than wine. It is made by first boiling some honey with water and then adding a bit of herb.' "

The compiler gives the clipped, succinct dictionary definition, and then, just like our own great Oxford English Dictionary, cites an illuminating authoritative instance of the word's use. The next entry is "*melodia,* obsolete term for 'tragedy'; see Callimachus' Commentaries." Here we get the dictionary definition plus a citation of its source, a treatise written by a literary luminary named Callimachus.

Philitas, Zenodotus, Bronze-Guts and the other scholars were by no means obscure unknowns born to blush unseen. Their names were as familiar to Greeks as Samuel Johnson or Noah Webster are to us. In a comedy staged at Athens, for example, one of the characters is a caterer who insists on discussing menus in fancy and archaic language. "No one on earth could understand him," grumbles the host in exasperation, "you'd have to get the complete works of Philitas and look up the meaning of every word."

Gallant Marc Antony presented Cleopatra with books taken from the Pergamum library. She spoke several languages and had a broad taste in literature.

Some scholars at Alexandria culled facts rather than words from the books in the library. One of the earliest of these was Callimachus, the authority on tragedy in the definition cited above, who worked in Alexandria between 280 and 250 B.C. Callimachus was the author of the voluminous *Tables of Persons Eminent in Every Branch of Learning,* a collection of lists—"tables" in his terminology—of lyric poets, writers of comedy and tragedy, orators, philosophers, historians, doctors, and so on, with the names in the tables arranged in alphabetical order and, for each, a brief biography and catalog of the man's writings. It was probably the first encyclopedia of literature. Here is an entry from a compilation made at some later date:

Artemidorus' *Glossary of Cooking Terms* often included recipe ingredients.

"Thucydides. Thucydides was of Athenian birth, the son of Olorus. Slanderers claim his father was a Thracian who migrated to Athens. A very able writer, he composed a history of the war between Athens and Sparta."

There were others besides Callimachus who organized information. Like their counterparts in lexicography, their works are preserved only in citations in later compilers. One of these, Pliny, a Roman of the first century A.D., stands out above all the others for his is the first encyclopedia to survive complete.

Today large research teams work for years to put together an encyclopedia. Pliny wrote his all by himself. What's more, he did it in his spare time during a busy career in government service: he started as an officer in the army, became governor of a number of provinces in Rome's far-flung empire and died while on duty as admiral of Rome's biggest fleet. What made Pliny's achievement possible was a fanatical way he had of making every minute count. He burned the midnight oil literally: his standard routine was to get in hours of study before break of day, when

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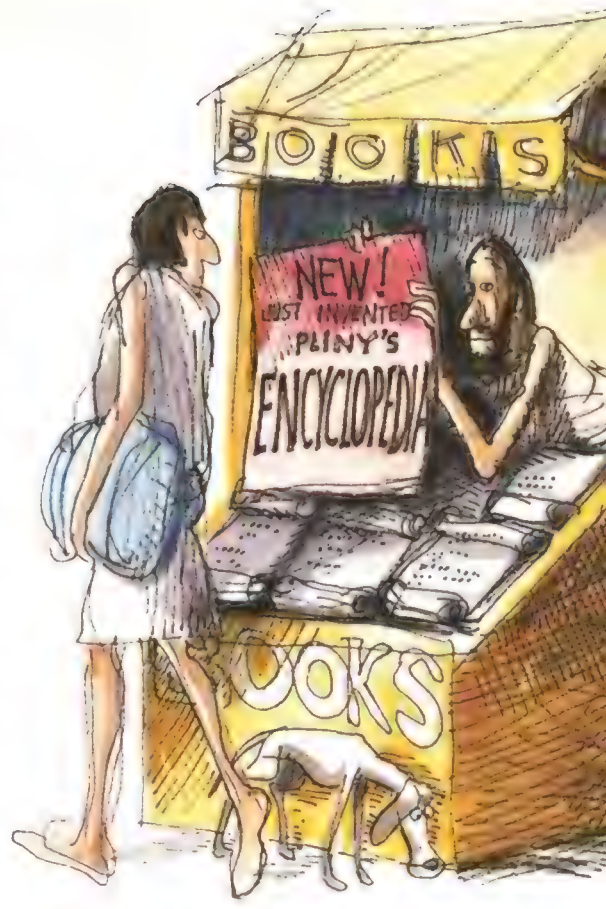
his official responsibilities began. He took his meals with pen and writing tablets alongside his plate so he could jot notes while chewing—as a secretary read to him. He never walked; a waste of time, he called it, since by going in a litter he was able to work en route. On more extended trips he had his secretary wear a tunic with special long sleeves that covered the hands so that he could take dictation even when the weather was freezing. Bathing slowed Pliny down but did not stop him: there was nothing he could do while he soaked, but the moment he was out, the reading and dictating resumed as he was still being rubbed and dried.

He called his encyclopedia *Natural History* and organized it by topic rather than alphabetically. To save readers time the book started with an extended table of contents. (The alphabetical index was not to be invented until the 16th century.) The *History* proper opened with a description of the Universe. Then came a long review of the geography of the known parts of the world, from the Strait of Gibraltar to India. Next in line was what we think of as natural history—zoology, botany, mineralogy.



Pliny the Elder compiled the first encyclopedia to survive complete.

The work is actually much broader than the title suggests because Pliny was passionately interested in natural history as it affected human beings. The sections on zoology and botany not only deal with animals and plants but with the foods, medicines and other materials that these provide. Pliny's section on mineralogy goes into a long review of art. But it was perfectly logical: after all, sculptors, painters and architects work with stone, minerals and various products of minerals.

The dictionary that would collect not just unusual and particularly difficult words but all words, the encyclopedia whose aim was to encompass not just literary history or natural history but all facts, lay far in the future, of course. However, there are two reference works which owe their entire creation to the scholars of Alexandria: the textbook and the grammar.

Hard-working Didymus wrote some 4,000 works, earning nickname Bronze-Guts.

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Soon Greek scholars were busying themselves amassing facts of all sorts.

though of the scholars working at Alexandria, Dionysius was one of the few who had been born there). Philitas, Zenodotus, Aristophanes of Byzantium and others had all dealt one way or another with individual points of grammar. But no one had ever attempted to organize all the material into a coherent whole until Dionysius published his *Art of Grammar* late in the second century B.C. He took up nouns and their cases, verbs and their tenses and moods and other forms, pronouns, articles and the rest of the parts of speech. The *Art of Grammar* is still extant, thanks to centuries of continuous use. Though short—it runs but 50 pages in a modern edition—and on a very elementary level, it filled a need. It became the standard grammar for Greek schoolboys up to the 12th century A.D. The Romans based their Latin grammars on it, and through these it became the model for all modern grammars.

By the second century A.D., when the Roman Empire was at its height, there were a dozen libraries in Rome alone, and others said to be found in practically all major cities. Most included in their holdings the voluminous works of Zenodotus, Callimachus, Bronze-Guts and the others who had fruitfully exploited the collection at Alexandria. When the ancient world collapsed, great quantities of the Greek and Roman writings disappeared along with so much else. It was only by the greatest good fortune that Pliny's encyclopedia, Euclid's textbook and Dionysius' grammar survived to point the way to the *Britannica*, to Webster's and to all the indispensable tools of learning now being transferred to microchips in the new computer age of instant and eternal retrieval.

During the first two decades or so of the third century B.C., a mathematician at Alexandria set himself the task of drawing up a beginner's manual for learning geometry. He did the job so successfully that his textbook became the longest-lived in history: in the early years of this century English schoolboys were still taught geometry from what was more or less a translation of Euclid's *Elements*. Euclid's genius lay in designing a superbly logical arrangement and in a presentation that was clarity itself. A student of geometry starts at the beginning, works step by logical step to the end and at that point thoroughly grasps the subject. The king, Euclid's patron, once asked if there were not some shorter way. There is "no royal road" to geometry, Euclid replied.

The distinction of writing the first grammar goes to Dionysius of Thrace (so called, apparently, because his father had a Thracian name, al-

The great museum was destroyed by Christian zealots in A.D. 391. Its remains were never found, but Alexandria's scholars can rest on their laurels.

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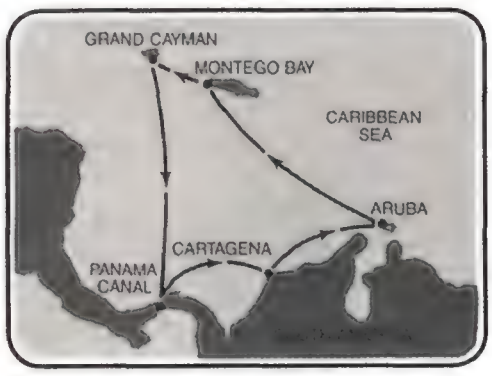

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Book reviews

Demented: The World of the Opera Div
Ethan Mordden
Franklin Watts, $16.95

It's quite possible that Ethan Mordde didn't intend this book to be a jeremia on the condition of opera today. Esse tially it is an informative analysis of thos special qualities that, through the years have identified great women singers, an an engrossing look at a number of thes grandes dames themselves—how they deal with their rare talent and how they re sponded to the people and events of thei times. But in those passages that compar the situation today with opera's "golde age," scattered as they are pell-mel throughout the text, the language is s intemperate that it tends to dominate th book or, at any rate, to give it a causti tone that, although diverting, rings some how unjustly.

This is particularly striking in light o the excitement that has seized the opera world recently—the American sector, a least. "Given opera's collapsed ideals" seems too despairing an assumption whe we see solid new productions of *Tosca* an *Porgy and Bess* securely established at th Met; when we have a stunning revival o Berg's *Lulu*, starring Julia Migenes-John son, the young Puerto Rican soprano who in a new movie version, has become every body's Carmen; when we have evidenc from regional companies across the coun try that opera is in a lively state of resur gence. Of course the author might wel look upon all this democratization of th art and say, "My point exactly."

Mordden shares the view of the lat Lanfranco Rasponi, at one time his col league on the staff of *Opera News*, tha

opera has come to a sad state, if not quite the "hideous spectacle" that Rasponi described two years ago in his own book, *The Last Prima Donnas.* And Mordden goes considerably further in assigning the blame. In fact, he sweeps just about everybody into the ranks of the guilty, including audiences, whose tastes are too conservative. A sampling:

Singers—"Now we have reached an age of opera singers who have no musical centering. They know nothing of the art, they do not endure training. . . . Regardless of the quality of voice, singers are not to a fine extent *singers* anymore. They are becoming an army of mouth-workers."

Critics—Most of them "lack expertise and taste; many cannot even write a sensible paragraph." And "They can make a glory sound like a disaster—partly because they wouldn't know one from the other, but mainly because they cannot summon up the exuberance that the rest of us feel for the musical theatre."

The temptation is strong to quote further because the text is haughty, witty and enormously entertaining. Mordden writes in an extravagant, headlong style that lends itself agreeably to its subject, those passionately committed women who personify the most extravagant, most preposterous art form in existence.

For all the captious asides, the book is well organized and logically instructive, the author himself obviously committed to a comprehensive interpretation of the world of the unworldly diva. Succeeding chapters deal with the elements of voice, musicianship, temperament and commitment; then with the external influences: great roles, ethnicity, politics and glamor, the maestro, stage director and impresario. The last 65 pages describe the diva's rise, fall and immortality.

Throughout this exposition, the great divas of the world have their entrances and their exits—Flagstad, Ponselle, Schwarzkopf, Tebaldi, Lehmann, Farrar, Melba, Stratas, Sutherland, Horne, Rysanek, Freni, Price and most frequently, Callas, who had a flawed voice but "a searching virtuosity." All are "demented," which in the argot of the opera trade is the supreme, and if they are wonders to hear, they are wonders to read about as well.

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Nearly always, James directs attention to the underlying

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vision that determines a writer's practice. Sometimes, of course, he doesn't peer deeply enough, as in his skewed judgment of Baudelaire's poetry and his underestimation of Stendhal's *The Red and the Black*. But most of these pieces—a third of which have never previously been collected—are brilliant mixtures of enthusiasm, an insider's critical understanding and reminiscence. Turgenev, for instance, "is particularly a favourite with people of cultivated taste; and nothing, in our opinion, cultivates the taste more than to read him."

Of the author of *La Comédie humaine*, James observes, "To get on in this world, to succeed, to live greatly in all one's senses, to have plenty of *things*—this was Balzac's infinite; it was here that his heart expanded." Mérimée's tales, he writes, "have gradually come to be considered perfect models of the narrative art; we confess our own admiration for them is such that we feel like declaring it a capital offense in a young story-teller to put pen to paper without having read them and digested them."

Such passion, such shrewdness appear on virtually every page of these two Bible-like volumes—sacred texts for any would-be writer. Of especial interest are James' book-length study of Hawthorne and the collected Prefaces to the New York Edition of his own work, these latter constituting a technical treatise on the novel. The *Hawthorne* quite openly conveys the young James' infatuation with high

James wrote some of our best novels; was he also our finest literary critic?

society and "civilization." In a famous passage, he enumerates those elements that the American scene lacks: "No sovereign, no court, no personal loyalty, no aristocracy, no church, no clergy, no army, no diplomatic service, no country gentlemen, no palaces, no castles, nor manors, nor. . . ." Without these traditional structures the novel as James conceived it—the sensitive individual in conflict with the strictures of society—would not be possible. Against this rather snooty attitude, the Prefaces enumerate James' later accomplishment: *The Ambassadors, The Turn of the Screw, The Aspern Papers* and *The Golden Bowl*, to name only a few.

As a writer, Henry James suffers from a reputation for prolixity and circumlocution; but very little of that hesitation, that intense refinement of expression, makes its way into his critical prose. These volumes may be read for pleasure by anyone who likes to read. Indeed, they could make Jamesians of us all.

Michael Dirda
Editor at *Washington Post Book World*

Agatha Christie: A Biography
Janet Morgan
Knopf, $18.95

Most readers will already know one fact about Agatha Christie (1890-1976): that she is the most successful and best-selling mystery writer who ever lived. In a career that spanned more than half a century, she produced more than 70 books, including "serious" novels (offered as the work of Mary Westmacott) and a number of neatly constructed plays, the best of which —*The Mousetrap*—has been running continuously in London since 1952.

Her life, though not without its disappointments and dramatic extremities, was essentially a success story. Janet Morgan describes it with rare empathy in this genuinely complete biography—the first work about Christie based on full access to her letters, diaries and manuscripts and to the revelations of those who knew her best. The resulting portrait succeeds wonderfully in showing the various roots of Christie's methods and the motivations that kept her hard at work writing even into her old age.

She was born Agatha Miller and raised in the Devon countryside in a well-off, leisured family. "Her world was private and safe" throughout a storybook childhood, during which Agatha was educated

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mostly at home and encouraged to develop her evident bookish interests and love of word and number games. But the family lost its wealth and her father died, apparently from worry, in his early 50s. This experience of unexpected complication and loss repeated itself in her marriage, begun during World War I, to young army officer Archie Christie, then ended, shockingly, after Archie confessed he loved another woman.

Agatha had been publishing detective stories since 1920, and in 1926 enjoyed her greatest success thus far with *The Murder of Roger Ackroyd*, a tale whose first-of-its-kind trick ending simultaneously outraged purist connoisseurs and evoked enormous reader interest. That same year was marked by her celebrated "disappearance": for ten days, Agatha was unaccountably missing from her home; she turned up under an assumed name at a "hydropathic hotel" not far away. The press and public had followed this story avidly, and speculations about Mrs. Christie's motives were rife and richly imaginative. Morgan points out that this event occurred just after her mother's death and at a time when Agatha knew she was losing her husband, and concludes that indeed "she might have induced a loss of memory." Whatever the case, from this point on Agatha Christie's life was public property.

She made a happy second marriage to archaeologist Max Mallowan, 15 years her junior, a professional as eminent in his field as Agatha would become in hers (he was knighted in 1967 and she became Dame Agatha in 1971). The demand for her writing grew and she kept producing —novels, stories, radio and film scripts, and a flavorful *Autobiography* (1977); her writing maintained a dependable professionalism, up until the very last books she wrote when in her 80s.

Janet Morgan's thoroughness in recounting this life is exemplary, though I wish she had given less emphasis to domestic trivia. She fairly assesses the work, conceding that her subject "was not a rigorous thinker" and "could sometimes write extraordinarily badly," while focusing firmly on the bottom-line appeal of the Christie novel: "Agatha's books last because they are good, if sometimes hopelessly improbable, stories. The reader, once hooked, wants to know what happens next." Fair enough—and well enough done.

Bruce Allen
Literary critic

The Improvement of Humanity: Education and the French Revolution
R. R. Palmer
Princeton University Press, $30

How should public education be paid for, and by whom? What should children be taught? What should be the role of religion in the schools? Who should attend the university? Even when civil war, foreign invasion and economic crisis threatened to overwhelm them, the leaders of the French Revolution still made time for debating such questions. For they believed that on the education of the young would ultimately depend the survival of the new polity they planned to build on the ruins of the Old Regime.

If the Revolutionaries were bent on "the improvement of humanity," they were by no means agreed as to how hu-

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manity could best be improved. They issued countless plans for educational reform; they disagreed violently over questions of principle and matters of detail. One of the virtues of Robert R. Palmer's new book, the latest of many he has written on aspects of the great 18th-century revolutions, is that he not only discusses what the politicians and theorists said and wrote about education; he tells us what actually went on in the classroom.

It is probable that finding out what went on in 18th- (or 20th-) century classrooms is a more challenging task than finding out what went on in 18th- (or 20th-) century bedrooms. Palmer can provide only glimpses of the encounter between teachers and the taught, but what he says makes clear that the quality of instruction was far better under the Old Regime than it has usually been given credit for, and schooling more widely accessible to all classes of the population than is sometimes believed.

He also shows that, both in terms of ideas for educational reform and of educational practice, the Revolution and the Old Regime had more continuities between them than either the Revolutionaries believed or historians have assumed. Not only in our own day do school reformers sometimes appear devoted to reinventing the wheel.

Palmer presents his findings under four ungainly but convenient headings: Nationalization—meaning, among other things, the growth of public authority over institutions formerly regarded as private; Politicization, or "the attempt to use education as a means of founding a new polity"; Democratization, or the quest for equality; and Modernization, perhaps best captured in Napoleon's intention "not to count on people in general but to work through a highly trained, organized, and cooperative body of scientific and administrative experts."

The Revolution's record of success and failure in these four realms of activity was, of course, mixed and uneven. Weighed down under crushing responsibilities, distracted by war, famine and the intrigues of counterrevolutionaries, the Revolutionaries in the short run destroyed more in the way of educational institutions than they managed to create. But their plans cast powerful beams down through the following century, serving to illuminate the building of the French educational system as it still exists today.

In telling a story that hasn't been told before, despite the importance the Revolutionaries attached to education, Palmer necessarily draws on a mass of sometimes tedious statistical data. But he enlivens his impeccable scholarship with amusing details—such as the invention of the lead pencil, "eventually so helpful to both private citizens and bureaucrats," as a by-product of the Revolution—and with a dry wit: alone among the great scientists of the Revolution, the mineralogist Haüy didn't have a street named after him, perhaps because "even the French may find [Haüy] difficult to pronounce."

The Improvement of Humanity is not only an important historical study but also a contribution to the discussion of public policy. The French Revolutionaries wrestled with most of the problems of education in a democratic society. These problems continue to perplex us.

J. E. Talbott
University of California, Santa Barbara

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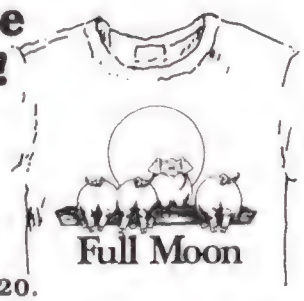

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Additional reading

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Smithsonian highlights

This month, the year-long Festival of India celebration begins at the Smithsonian; the special listings in this column, along with *Highlights continued*, describe some of the planned activities. But the Festival of American Folklife, to be held on the Mall June 26-30 and July 3-7, will also honor two other rich traditions: the culture of black people in New Orleans, and cultural conservation. For more information on any activities during June, call (202) 357-2700 or TDD for hearing impaired (202) 357-1729.

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Special June exhibits and events

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Wine: Celebration and Ceremony (June 4-October 13) Major exhibition.
Carnegie's Libraries: Sesquicentennial Celebration (June 11-September 1).

Renwick Gallery
The Woven and Graphic Art of Anni Albers (June 12-January 5, 1986).

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Hirshhorn Museum & Sculpture Garden
Representation Abroad (June 5-September 2) Exhibition of 147 works.

National Air and Space Museum
The Dream is Alive (opens June 21; continues indefinitely) See page 132.

Exhibition catalogs

Catalogs available at this time include:
Aditi: The Living Arts of India (paper, $14.95)
Anni Albers (paper, $17.50)
Representation Abroad (paper, $15)
A Truthful Likeness: Chester Harding (paper, $19.95)

To order, send check or money order to Museum Shops, Box 44083, Washington, D.C. 20026-0083. Include 15 percent of total purchase to cover postage and handling (minimum, $1.75).

Smithsonian on the air

Radio Smithsonian: features include Festival of India, jet aircraft design.
Here at the Smithsonian. . .: two-minute features include a look at art of Jim Dine.

The Work of Peace: a new Smithsonian film telling the dramatic story of the Treaty of Paris of 1783 premieres on public television on June 28. The half-hour special was filmed in France and England.

To find out what stations in your area carry these radio and TV programs, write: Office of Telecommunications, NMNH Room C222B, Washington, D.C. 20560.

Resident Associate events

To become a Resident Associate, or to find out about the many other activities presented monthly, or for fee and ticket information, call 357-3030. Here are some June events:
Wagner Washington Premiere (June 9-12) Two showings of nine-hour film epic starring Richard Burton, Vanessa Redgrave.
Ravi Shankar in Concert (June 15; 8 P.M.) With tabla virtuoso Alla Rakha.
William Bolcom and Joan Morris Salute Jerome Kern and the Music of the Movies (June 26; 8 P.M.) Concert.
Thelonious Monk Solo Jazz Piano Concerts: Abdullah Ibrahim (Dollar Brand) and Kirk Lightsey (June 28; 8 P.M.).

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some June exhibits: San Francisco (June 29-August 11) *Exploring Microspace*, The Exploratorium. St. Petersburg, Florida (June 1-30) *Studied Beauty: Portraits by Cecil Beaton*, Museum of Fine Arts.

Terra-cotta horses in South Indian countryside were photographed by Rosalind Solomon, whose show opens June 4 in NMNH Rotunda Gallery.

Aditi: The Festival of India at the Smithsonian 1985-1986

The Festival of India 1985-1986, a celebration of Indian culture in the United States, originated with an agreement between the late Indian Prime Minister Indira Gandhi and President Reagan in 1982. The Festival will open in June in Washington, D.C., and for the next year will bring art, music, drama, dance, film and crafts to major cultural institutions throughout the United States. Here are some of the highlights of the Smithsonian Institution's participation in the Festival (for more information on Smithsonian activities, call 357-2700):

Aditi: A Celebration of Life (June 4-July 28) Unique living exhibition at NMNH will consist of some 1,500 artifacts and 40 traditional performers, artisans and craftspeople (see page 44).

The Arts of South Asia (through November 30) Exhibition at the Freer Gallery of Art includes 70 masterpieces of painting and sculpture.

Rosalind Solomon: India (June 4-August 31) Exhibition in NMNH Rotunda Gallery of 39 photographs taken primarily at Indian festivals; circulated by the International Museum of Photography, George Eastman House, Rochester, New York.

Symposium: The Canvas of Culture—Rediscovery of the Past as Adaptation for the Future (June 21-23) Participants from the United States and India will explore critical questions of loss, continuity and change in Indian life (call 357-2328 for more information).

India at the Smithsonian's Festival of American Folklife (June 26-30, July 3-7) See *Highlights continued.*

Festival of India Exhibition (June 7-September 30) Special exhibition in Dibner Room of NMAH features books, prints and manuscripts documenting aspects of Indian culture (by special appointment; call 357-1568).

Aditi: The Monies of India (September 15-March 1986) Exhibition at NMAH.

"All Sorts of Painted Stuff . . .": Indian Chintz and its Western Counterparts (October 31-January 30, 1986) Exhibition at NMAH will feature Indian textiles.

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Highlights continued

A spirited Indian festival

This summer, acrobats, fortune tellers and street vendors will turn the Mall into a joyous party

Stacks of gourd flutes, bowls filled with ayurvedic preparations, women painting visitors' hands with a cool, pasty henna concoction which when rinsed off leaves a tattoolike design—these are among the treats in store when the Festival of American Folklife holds its *mela*, or Indian fair, on the Mall. From June 26-30 and July 3-7, five acres will come alive with the sights, sounds, smells, textures and tastes of these joyful celebrations. Booths will brim with fortune tellers, food vendors and artisans, while acrobats, animal impersonators and musicians will wander among the crowds, duplicating the street performances they ordinarily give in Delhi. Above them all will tower 20-foot-high bamboo-and-cloth statues of Indian heroes, heroines and villains.

If you come to the fair and want to steal away for contemplation, visit the Freer Gallery of Art. There, a major exhibition entitled "The Arts of South Asia" (which will run through November 30) presents a complete survey of this museum's holdings from the subcontinent. In India, it seems, things are either very hectic or gallery-still—and the Mall this summer will be no different.
Constance Bond

At Indian fair, ayurvedic seeds and dry herbs for medical uses will be displayed.

Ivory throne leg from Orissa, 13th century, is among masterpieces at Freer.

Mogul ruler Jahangir embraces Persian ruler Shah Abbas in Freer painting.

Flutes of all kinds will be among items hawked by street vendors at the *mela*.

Hand, painted with cool henna paste, will boast red tattoolike design after rinsing.

Toy bus of *siki* grass will be on view in "Aditi" exhibition in NMNH.

Toronto

Vintage Vantage

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Domestic Study Tours

Vermont Sampler July 12-20: Peaceful beauty sets the stage for a look at Yankee history, culture and crafts.

Waterton-Glacier International Peace Park July 16-27 or August 13-24: Hike through spectacular alpine scenery with naturalists. Spend nights in remote, picturesque lodges.

Oregon July 19-28: Fresh sea air, colorful wild flowers, mountain vistas and historic lodges highlight this outdoor adventure.

Natural History in the Colorado Rockies July 28-August 3: Hike majestic Pikes Peak area, see local flora and fauna.

Middle Fork August 5-13: An unforgettable river trip on Idaho's Salmon River.

Crow Canyon Archaeology August 11-18: Get hands-on experience as you join archaeologists near Mesa Verde, Colorado, to participate in a dig at an ancient Indian site.

Delta Queen September 6-14: STEAMBOAT A-COMIN! Board the legendary paddle-wheeler for a nostalgic voyage on the mighty Mississippi to Hannibal, Missouri, for the grand celebration of Mark Twain's 150th birthday.

New England Seaports September 12-22: Relive the great seafaring era. Visit the ports of Boston, Nantucket, Newport.

Arches/Canyonlands September 21-28: Utah's magnificent red-rock country, land of deserts, canyons and rivers. Travel by trail, jeep and raft with guide.

Maine September 21-30: Hike amid gorgeous fall foliage on rocky coast, inland mountains with a naturalist.

Pueblo Indians and Spanish Villages of New Mexico September 28-October 7: Visit craftsmen, museums and private collections in Santa Fe, Taos and Albuquerque.

California Wine Country October 6-12: Learn to select, enjoy and evaluate California wines. Visit wineries in Napa, Sonoma and Mendocino with wine experts.

Cumberland Island November 9-15: Camp on unspoiled beaches, study the ecology of this Georgia island.

Everglades in December: For the novice or expert, canoe and camp among the Ten Thousand Islands along the west coast of Florida.

Washington "Anytime" Weekend: Discover your capital city in the Smithsonian style. As a membership benefit enjoy private tours, luxurious accommodations and much, much more. A perfect weekend getaway. Must reserve ten days in advance.

Foreign Study Tours

People's Republic of China, 1985: Exclusive tours to a variety of destinations are led by a Sinologist and include intensive pretour briefing.

Setting the Stage for Shakespeare June 13-26: Savor the atmosphere of Chaucer and Malory. Visit places that inspired their literary works.

Europe's Northern Waterways June 30-July 13: Aboard *Argonaut*, cruise scenic rivers, tranquil canals and historic sea-lanes from England to Denmark.

Cambridge/Smithsonian Aerospace Studies July 11-28: Study history of air power or astronomy. Begin at National Air and Space Museum, then fly to famous English university.

Land of the Vikings July 21-August 4: Three days in Edinburgh, then board the *Illiria* for Norway's majestic fjords and Copenhagen.

Iberia and Provence August 12-26: Visit Santiago de Compostela and Carcassonne during a cruise on the elegant *Argonaut.*

Trans-Siberia September 3-25: Cross Siberia on the *Russia Express.* Depart for Outer Mongolia, Central Asia or Moscow.

Rome and Beyond September 6-21: Study the history and architecture of classical Italy. Spend six days in Rome; then go to Florence, Venice or the southern coast.

Oxford/Smithsonian Seminar September 13-28: An exciting program in its seventh year. Study with Oxford faculty, live in an academic setting and see historic villages.

Europe by Train September 18-October 7 or October 9-28: Splendid vistas by first-class trains: *Orient Express*, Switzerland's *Glacier Express*, France's swift *TGV.*

Spain September 27-October 12: See the superb art and architecture of Madrid, then move on to serene Catalonia or Andalusia.

Peru September 28-October 13: Immerse yourself in the country's ancient civilization. Visit Lima, Cuzco, Machu Picchu.

Highlights of Austrian Civilization October 5-20: Enjoy the romance of Salzburg and Vienna; study their cultural heritage.

Adriatic Shores October 6-18: Board the *Argonaut*, cruise to Yugoslavia, Italy, Korcula Island as well as Corfu, Ithaca.

Mediterranean World October 9-23: Take the *Illiria* to the classical centers of Greece, Sicily, Italy, Crete and Carthage.

India by Train October 30-November 15: Ride maharaja's "Palace on Wheels" and visit the cities and sites of Rajasthan.

Egypt and the Nile November 11-30: From Aswan to Cairo aboard a riverboat.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochure

n Washington

Smithsonian Seminars

Expand your educational horizons this fall as you combine a pleasure-filled visit to the nation's capital with stimulating week-long courses of study that highlight Smithsonian museums and research facilities. These purposeful vacation seminars give you the opportunity to share special interests with fellow Associates.

From October 27 through November 1, Smithsonian scholars will lead five exciting new seminars. In addition to a week of intensive study, participants will enjoy specialized field trips, a gala welcoming buffet, evening performances and an elegant farewell dinner. Hotel is optional. The fall 1985 seminars include:

Anthropology Today
Explore the diverse collections and current research at the Museum of Natural History during lectures, field trips, discussions with specialists in physical and cultural anthropology, archaeology and linguistics.

Perspectives on American Art
Curators from the National Museum of American Art will offer illustrated lectures, tours of the museum's exhibition, preparation and conservation areas. Trips to renowned Washington landmarks offer new insights on American art from the 18th century to the present.

Music of the Baroque Era
Enhance your enjoyment of this extraordinary music as you participate in a unique program of lectures, demonstrations and performances on historic instruments by the Smithsonian Chamber Players.

Fossils: Archives of the Earth
Delve into the Earth's most distant past as you participate in discussions, hands-on workshops with actual specimens, and a daylong visit to fossil beds in the Shenandoah Mountains with geologists, paleobotanists and paleobiologists from the National Museum of Natural History.

Man's Quest for Wings:
Highlights of Aviation History
Curators from the National Air and Space Museum will lead special tours of the museum and its restoration facility during this seminar, which features lectures and films that chronicle America's outstanding achievements in air and space.

(202) 357-1350 for seminar brochures.

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By Jack Fincher

Homely hints for the new man in the Kremlin

Mikhail Gorbachev's rise to power in the Soviet Union strikes a blow for—or against, I'm not sure which—54-year-olds everywhere. I mean, it's nice to be known as young and vigorous again, however decrepit the context. But how many of us are running our own country?

In a way it's a corollary to a story told by Kurt Vonnegut about the '60s when he learned that Melvin Laird, whose wife went to high school with him in Indianapolis, had been named Secretary of Defense: you know you're middle-aged when the peers you couldn't stand as teenagers are suddenly in charge of everything.

But no matter. We are all at the helm of our own ship of state, sinking and floating, drifting or steaming ahead. And as my wife says, show me a family—or a family of nations?—and I'll show you problems. Why, only yesterday I updated the interpersonal section of my Executive Organizer's Calendar of the Week, and, if he cares to exercise a little global imagination about its contents, Comrade Gorbachev can see that our differences are principally a matter of degree, not kind. And good luck to us both.

Monday: In flagrant violation of mutual agreement, working daughter continues to occupy back bedroom in strength. Stereo, saddle, unmade bed, piles of dirty laundry, acres of Diet Pepsi bottles. Ironing board, undone ironing—and iron still on. A caliph's cache of costume jewelry, 25-gallon water jug full of pennies and worthless IOUs. Personal self sometimes in evidence, usually at sleeping hour. And overnight on occasion—there is proof by reconnaissance in the form of her half-Corgi, half-Chihuahua, a high-speed, short-haired missile with demonstrated destabilizing capacity for our tranquil over-50 *ménage à deux*. Top-level talks bogged down over potential flash point of precise timing. ("Dad, I can't talk about this right now.")

Tuesday: College daughter's financial posture in academe growing more precarious by minute. Complete collapse of her banking system, with grave repercussions for key lenders, perilously imminent unless painful (for her) and costly (for us) emergency measures taken. She living in (third?) world of her own. Rejects proposed austerity program as odious and unthinkable precondition for necessary massive aid. If pride and independence not respected, she threatens to forfeit loans, expropriate gasoline and phone credit cards. Sees no inherent contradiction in stonewalling strategy. ("Stop treating me like a teenager or else!" she wails.)

As the cosigner on guaranteed college loan, go slowly in risking wider involvement in what is essentially passing spasm of unavoidable internal chaos. Otherwise danger of becoming financial Vietnam with no light at end of dollar tunnel.

Wednesday: Threats to invoke United Nations Charter against working daughter's unwarranted invasion unavailing; not member in good standing of anything but Cosmetic-of-the-Month Club. Make further diplomatic overtures this week. If pleas to find own apartment or pay rent fall on deaf (also multiply-pierced) ears, lodge stiff protest. Demand evacuation by end of month. Threaten write Ann Landers about continued hostile presence (when cornered) of 23-year-old girl (woman?) immune to reasoned appeal on matter parents—and their parents—took for granted. Recommended use of force probably counterproductive, almost certainly illegal in eyes of World Court.

Thursday: World Bank of no earthly use. Coed credit nonexistent. After consultation with marriage ally, propose limited infusion of funds to college daughter as corrective steps taken: fuller employment, more responsible fiscal stance, less inflated purchases, sounder budget. Resist blackmail implicit in telephoned offer to quit school and seek career as sexual surrogate. Ignore raucous on-line demonstrations designed for internal consumption to whip up support for maintaining unrealistic policies. Avoid precipitous action that would compel major realignment in current balance of power. Keep open options and trust in the fundamental, if frequently hidden, decency of a usual sensitive and self-reliant human being.

Friday: Recover from economy-sappi state (actually out-of-state) visit by mov maker son and girl friend. Take ste probably futile, to maintain normal d lomatic channels. Also, counteract visi skewing effect on balance of payments household foreign-beer imports with o setting loan from marriage ally. For ha monious relations try not to inquire int strictly internal matters: how much h weighs, how well he sleeps, last time h fixed himself a hot meal. As a former de pendent state now well on way to super power status, touchy about autonomy Instead, discuss installing hotline to spee lagging frequency of communication.

Saturday: Conduct frank and full ex change of views with marriage ally o vital, ongoing issue of mutual disarma ment. Try negotiate resolution both par ties find acceptable to crucial question o throw-weight in event conflict breaks out ("Will you please stop throwing you weight around?") Strive for peace in ou time but settle for détente.

Sunday: Meet, and mutually attack domestic problem of family budget defici both chronic and acute. And growing.

To which, Comrade Gorbachev, I add further injunction you may find difficu in your new political position, 54-year young and vigorous or no: Pray.

DEWAR'S PROFILE:

GARY JOBSON

HOME: Annapolis, MD.

AGE: 34

OCCUPATION: Yacht-racing tactician; author; lecturer; editor-at-large, *The Yacht*.

HOBBY: Trying to stay home for more than a week at a time.

LAST BOOK WRITTEN: *Storm Sailing*.

LATEST ACCOMPLISHMENT: Tactician of a 1983 America's Cup contender; created the Liberty Cup, a new world-class yacht-racing event in New York Harbor.

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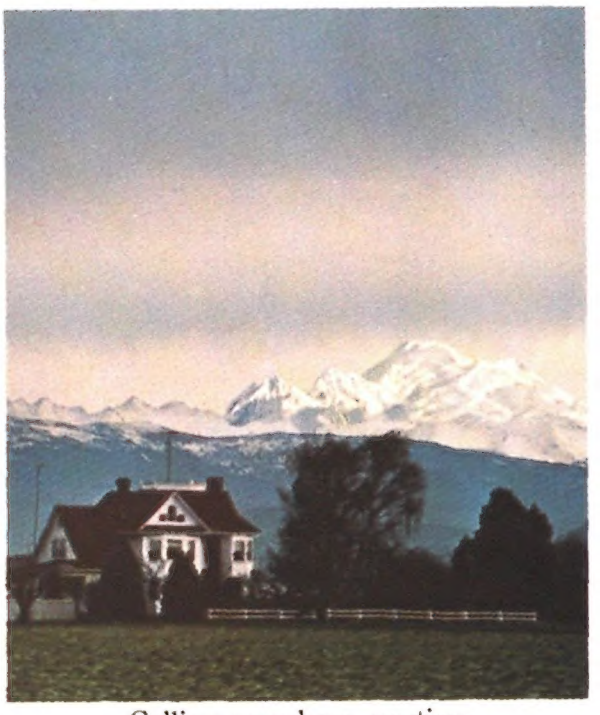

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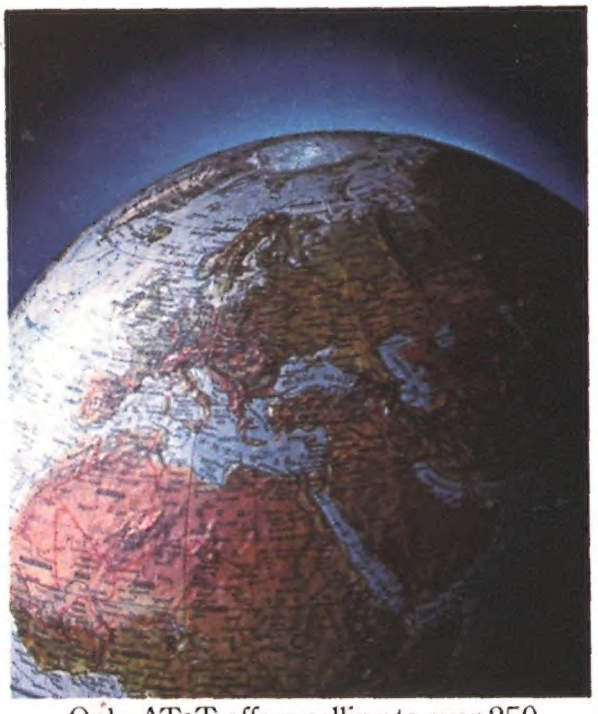

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